STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

February 26, 2009

Mr. Bharat Mathur, Acting Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard (R-19J)
Chicago, Illinois 60603-3950

Dear Administrator Mathur:

Enclosed is the Michigan Department of Environmental Quality's (MDEQ) submittal of a request for redesignation to attainment of the ozone National Ambient Air Quality Standard for Southeast Michigan and a proposed revision to the Michigan State Implementation Plan.

The MDEQ requests that the U.S. Environmental Protection Agency (EPA) proceed with final review and approval of an attainment redesignation. If you have any questions or need additional information, please contact Mr. G. Vinson Hellwig, Chief, Air Quality Division, MDEQ, at 517-373-7069.

Sincerely,

Steven E. Chester
Director
517-373-7917

Enclosure
cc: Mr. John Mooney, EPA Region 5
Ms. Kathleen D'Agostino, EPA Region 5
Mr. Chuck Hersey, SEMCOG
Mr. Jim Sygo, Deputy Director, MDEQ
Mr. G. Vinson Hellwig, MDEQ
Ms. Mary Maupin, MDEQ

Michigan Department of Environmental Quality
Air Quality Division

Proposed Revision to Michigan's State Implementation Plan for Achieving the Ozone National Ambient Air Quality Standard

REQUEST TO REDESIGNATE TO ATTAINMENT STATUS

for the

Southeast Michigan Counties of
Lenawee, Livingston, Macomb, Monroe, Oakland,
St. Clair, Washtenaw, and Wayne

and

Proposed Maintenance Plan for Southeast Michigan

February 2009

TABLE OF CONTENTS

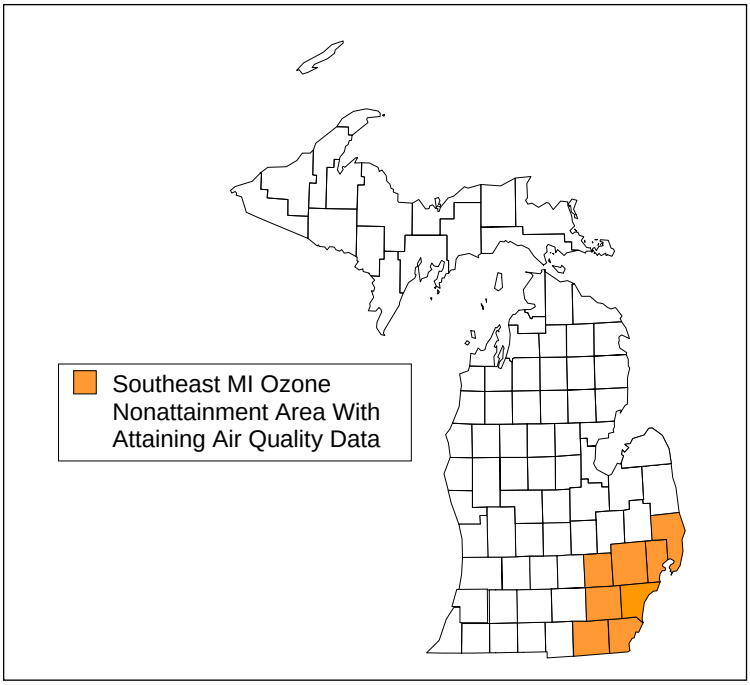
1. INTRODUCTION

The State of Michigan, through the Michigan Department of Environmental Quality (MDEQ), is asking the U.S. Environmental Protection Agency (EPA) to make a determination that Southeast Michigan is in attainment with the ozone National Ambient Air Quality Standards (NAAQS), to change the legal status of the area from nonattainment to attainment, and to approve the maintenance plan as a revision to the Michigan State Implementation Plan (SIP). The eight counties in the Southeast Michigan ozone nonattainment area are Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne.

The EPA established a revised NAAQS for ozone, the 8-hour ozone standard, in 1997. The EPA designated areas in Michigan as attainment or nonattainment of the 8-hour standard in April 2004. The designations were based on design values derived from air quality monitoring data for the years 2001-2003. Design values over 0.084 parts per million (ppm) are considered to be violating the standard, too high to be protective of health. The EPA designated 25 counties in Michigan as nonattainment.

Air quality monitoring data collected in the 2002-2004 period showed improved ozone design values in 11 of the original 25 counties. For the period 2003-2005, an additional five counties had attainment level design values. These 16 counties have been redesignated as attainment for the 8-hour ozone standard. Now, the most recent ozone data, for 2006-2008, shows attainment level ozone design values for the eight counties of Southeast Michigan (**Figure 1.1**).

Figure 1.1: Southeast Michigan Counties for Ozone Attainment Redesignation
Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne



2. REDESIGNATION PACKAGE COMPONENTS

Section 107 of the Clean Air Act (CAA) establishes requirements to be met in order for an area to be qualified for redesignation to attainment including:

- A determination that the area has attained the 8-hour ozone NAAQS;
- An approved SIP for the area under Section 110 (k) of the CAA;
- A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and applicable federal requirements;
- A fully approved maintenance plan under Section 175A of the CAA; and
- A determination that all Section 110 and Part D requirements under the CAA have been met.

This document summarizes compliance with each required component of an attainment redesignation.

3. DEMONSTRATION OF ATTAINMENT OF THE STANDARD

The MDEQ maintains a comprehensive network of ozone air quality monitors throughout Michigan with the primary objective being to determine compliance with the ozone NAAQS. The MDEQ submits network reviews to the EPA Region 5 annually to ensure that air monitoring operations comply with all applicable federal requirements. **Figure 3.1** shows the locations of ozone monitors in Southeast Michigan.

Figure 3.1: Location of Ozone Monitors

Data from air quality monitors indicates whether or not violations of the ozone NAAQS are occurring. The design value is the three-year average of the fourth highest 8-hour average values, based on data from each of the monitoring sites in an attainment or nonattainment area. For the period 2006-2008, the design value is less than 0.08 ppm for the Southeast Michigan area. **Table 3.1** shows the design value for 2008, confirming attainment of the NAAQS.

Table 3.1: Southeast Michigan 2008 Monitor Data Design Value for Ozone NAAQS (ppm)

COUNTY	MONITORS (AIRS ID)	4TH HIGH 2006	4TH HIGH 2007	4TH HIGH 2008	DESIGN VALUE 2008	DESIGN VALUE 3-YR AVERAGE ROUNDED
Lenawee	Tecumseh (260910007)	0.074	0.081	0.072	0.076	0.08
Macomb	New Haven (260990009)	0.078	0.093	0.073	0.081	0.08
	Warren (260991003)	0.078	0.091	0.072	0.080	
Oakland	Oak Park (261250001)	0.072	0.086	0.074	0.077	0.08
St. Clair	Port Huron (261470005)	0.078	0.089	0.067	0.078	0.08
Washtenaw	Ypsilanti (261610008)	0.076	0.077	0.069	0.074	0.07
Wayne	Allen Park (261630001)	0.068	0.079	0.067	0.071	0.07
	E-7 Mile (261630019)	0.078	0.092	0.078	0.082	0.08
	Linwood (261630016)	0.069				
	SW HS (261630015)	0.067				

Table 3.2 shows historic 8-hour ozone design values at each site in the area to be redesignated.

Table 3.2: Historic 8-Hour Ozone Design Values (ppm)
***4th highest 8-hour average and 3-year average truncated**
****Final site average rounded**

SITE	AIRS ID	YEAR	4TH HIGHEST 8-HR MAX*	SITE DESIGN VALUE	SITE DESIGN VALUE AVERAGE**
Tecumseh	260910007	1993	0.074	7-6-93 sampling began	
		1994	0.084		
		1995	0.089	0.082	0.08
		1996	0.085	**0.086**	**0.09**
		1997	0.076	0.083	0.08
		1998	0.086	0.082	0.08
		1999	0.083	0.081	0.08
		2000	0.082	0.083	0.08
		2001	0.086	0.083	0.08
		2002	0.089	**0.085**	**0.09**
		2003	0.088	**0.087**	**0.09**
		2004	0.074	0.083	0.08
		2005	0.082	0.081	0.08
		2006	0.074	0.076	0.08
		2007	0.081	0.079	0.08
		2008	0.072	0.075	0.08

Table 3.2: Historic 8-Hour Ozone Design Values (ppm)

*4th highest 8-hour average and 3-year average truncated
**Final site average rounded

SITE	AIRS ID	YEAR	4TH HIGHEST 8-HR MAX*	SITE DESIGN VALUE	SITE DESIGN VALUE AVERAGE**
		2008	0.072	0.075	0.08
New Haven	260990009	1992	0.082	7-14-80 sampling began	
		1993	0.085		
		1994	0.097	**0.088**	**0.09**
		1995	0.092	**0.091**	**0.09**
		1996	0.091	**0.093**	**0.09**
		1997	0.090	**0.091**	**0.09**
		1998	0.098	**0.093**	**0.09**
		1999	0.096	**0.094**	**0.09**
		2000	0.075	**0.089**	**0.09**
		2001	0.095	**0.088**	**0.09**
		2002	0.095	**0.088**	**0.09**
		2003	0.102	**0.097**	**0.10**
		2004	0.081	**0.092**	**0.09**
		2005	0.088	**0.090**	**0.09**
		2006	0.078	0.082	0.08
		2007	0.093	**0.086**	**0.09**
		2008	0.073	0.081	0.08
Warren	260991003	1992	0.081	1-1-77 sampling began	
		1993	0.083		
		1994	0.087	0.083	0.08
		1995	0.090	**0.086**	**0.09**
		1996	0.090	**0.089**	**0.09**
		1997	0.081	**0.087**	**0.09**
		1998	0.090	**0.087**	**0.09**
		1999	0.090	**0.087**	**0.09**
		2000	0.077	**0.085**	**0.09**
		2001	0.094	**0.087**	**0.09**
		2002	0.092	**0.087**	**0.09**
		2003	0.101	**0.095**	**0.10**
		2004	0.071	**0.088**	**0.09**
		2005	0.089	**0.087**	**0.09**
		2006	0.078	0.079	0.08
		2007	0.091	**0.086**	**0.09**
		2008	0.072	0.080	0.08

Table 3.2: Historic 8-Hour Ozone Design Values (ppm)

***4th highest 8-hour average and 3-year average truncated**
****Final site average rounded**

SITE	AIRS ID	YEAR	4TH HIGHEST 8-HR MAX*	SITE DESIGN VALUE	SITE DESIGN VALUE AVERAGE**
Oak Park	261250001	1992	0.081	1-9-81 sampling began	
		1993	0.075		
		1994	0.087	0.081	0.08
		1995	0.084	0.082	0.08
		1996	0.074	0.081	0.08
		1997	0.076	0.078	0.08
		1998	0.089	0.079	0.08
		1999	0.088	0.084	0.08
		2000	0.075	0.084	0.08
		2001	0.090	0.084	0.08
		2002	0.093	**0.086**	**0.09**
		2003	0.090	**0.091**	**0.09**
		2004	0.075	**0.086**	**0.09**
		2005	0.078	0.081	0.08
		2006	0.072	0.075	0.08
		2007	0.086	0.078	0.08
		2008	0.074	0.077	0.08
Port Huron	261470005	1992	0.075	2-28-81 sampling began	
		1993	0.087		
		1994	0.086	0.082	0.08
		1995	0.094	**0.089**	**0.09**
		1996	0.086	**0.088**	**0.09**
		1997	0.079	**0.086**	**0.09**
		1998	0.091	**0.085**	**0.09**
		1999	0.091	**0.087**	**0.09**
		2000	0.080	**0.087**	**0.09**
		2001	0.084	**0.085**	**0.09**
		2002	0.100	**0.088**	**0.09**
		2003	0.086	**0.090**	**0.09**
		2004	0.074	**0.086**	**0.09**
		2005	0.088	0.082	0.08
		2006	0.078	0.080	0.08
		2007	0.089	**0.085**	**0.09**
		2008	0.067	0.078	0.08

Table 3.2: Historic 8-Hour Ozone Design Values (ppm)

*4th highest 8-hour average and 3-year average truncated

**Final site average rounded

SITE	AIRS ID	YEAR	4TH HIGHEST 8-HR MAX*	SITE DESIGN VALUE	SITE DESIGN VALUE AVERAGE**
Ypsilanti	261610008	2000	0.078	4-1-2000 sampling began	
		2001	0.092		
		2002	0.091	**0.087**	**0.09**
		2003	0.091	**0.091**	**0.09**
		2004	0.071	0.084	0.08
		2005	0.083	0.081	0.08
		2006	0.082	0.078	0.08
		2007	0.077	0.078	0.08
		2008	0.069	0.074	0.07
Allen Park	261630001	1992	0.070	1-1-80 sampling began	
		1993	0.069		
		1994	0.074	0.071	0.07
		1995	0.078	0.073	0.07
		1996	0.082	0.078	0.08
		1997	0.075	0.078	0.08
		1998	0.079	0.078	0.08
		1999	0.087	0.080	0.08
		2000	0.067	0.077	0.08
		2001	0.080	0.078	0.08
		2002	0.088	0.078	0.08
		2003	0.085	0.084	0.08
		2004	0.065	0.079	0.08
		2005	0.077	0.075	0.08
		2006	0.068	0.070	0.07
		2007	0.079	0.074	0.07
		2008	0.067	0.071	0.07

Table 3.2: Historic 8-Hour Ozone Design Values (ppm)
***4th highest 8-hour average and 3-year average truncated**
****Final site average rounded**

SITE	AIRS ID	YEAR	4TH HIGHEST 8-HR MAX*	SITE DESIGN VALUE	SITE DESIGN VALUE AVERAGE**
Linwood	261630016	1992	0.078	1-1-80 sampling began	
		1993	0.067		
		1994	0.092	0.079	0.08
		1995	0.077	0.078	0.08
		1996	0.079	0.082	0.08
		1997	0.079	0.078	0.08
		1998	0.086	0.081	0.08
		1999	0.084	0.083	0.08
		2000	0.077	0.082	0.08
		2001	0.087	0.083	0.08
		2002	0.092	**0.085**	**0.09**
		2003	0.084	**0.087**	**0.09**
		2004	0.066	0.080	0.08
		2005	0.079	0.076	0.08
		2006	0.069	0.071	0.07
				Discontinued 9-30-2006	
E. 7 Mile	261630019	1992	0.077	4-1-77 sampling began	
		1993	0.083		
		1994	0.094	0.084	0.08
		1995	0.091	**0.089**	**0.09**
		1996	0.086	**0.090**	**0.09**
		1997	0.088	**0.088**	**0.09**
		1998	0.093	**0.089**	**0.09**
		1999	0.092	**0.091**	**0.09**
		2000	0.080	**0.088**	**0.09**
		2001	0.092	**0.088**	**0.09**
		2002	0.083	**0.085**	**0.09**
		2003	0.098	**0.091**	**0.09**
		2004	0.066	0.082	0.08
		2005	0.080	0.081	0.08
		2006	0.078	0.074	0.07
		2007	0.092	0.082	0.08
		2008	0.078	0.082	0.08
SWHS	261630015	2006	0.067	4-1-06 sampling began Discontinued 9-30-06	

The completeness criteria for ambient monitoring data are specified in *Title 40 of the Code of Federal Regulations (CFR), Part 50, National Primary and Secondary*

Ambient Air Quality Standards, Appendix I; and quality assurance criteria are specified in *40 CFR, Section 58.10, Quality Assurance.* A minimum completeness of 75 percent annually and 90 percent over a three-year period is required. Data completeness information is presented in **Table 3.3**. All monitors in Southeast Michigan meet the annual and three-year completeness criteria. The quality assurance criteria in 40 CFR, Section 58.10 have also been met.

Table 3.3: Data Completeness

SITE	AIRS ID	YEAR	VALID DAYS MEASURED	ANNUAL % COMPLETE	3-YEAR % COMPLETE
Tecumseh	26091007	2006	171	93	92
		2007	177	97	
		2008	1159	87	
New Haven	260990009	2006	183	100	100
		2007	183	100	
		2008	183	100	
Warren	260991003	2006	181	100	97
		2007	174	93	
		2008	177	99	
Oak Park	261250001	2006	170	93	97
		2007	178	97	
		2008	183	100	
Port Huron	261470005	2006	183	100	100
		2007	187	100	
		2008	182	99	
Ypsilanti	261610008	2006	167	91	96
		2007	175	96	
		2008	183	100	
Allen Park	261630001	2006	172	94	95
		2007	176	96	
		2008	174	95	
Linwood*	261630016	2004	174	95	93
		2005	160	87	
		2006	180	98	
E. 7 Mile	261630019	2006	174	95	97
		2007	183	100	
		2008	177	97	
SW HS**	261630015	2006	183	100	

* Sampling ended 9-30-2006
** Short-term study

4. SIP APPROVAL AND COMPLIANCE WITH CAA SECTION 110 AND PART D REQUIREMENTS

The Southeast Michigan nonattainment area is classified as a marginal nonattainment area under Subpart 2 of the CAA. Section 110 of the CAA delineates general SIP requirements and Part D contains requirements specific to Subpart 1 and Subpart 2 marginal nonattainment areas. Southeast Michigan meets all applicable requirements for ozone redesignation under these provisions.

Southeast Michigan, excluding Lenawee County, was originally classified as a moderate nonattainment area under the 1-hour ozone NAAQS. The area was redesignated to attainment in 1995 (*60 Federal Register (FR) 12459*). The EPA determined that all ozone SIP requirements had been met in approving the attainment redesignation for the 1-hour ozone standard. New nonattainment area requirements for the 8-hour NAAQS required to be completed for an attainment redesignation include only a new baseline emission inventory. Michigan's 8-hour ozone baseline emissions inventory for 2002 was submitted to EPA in July 2006. However, a 2005 baseline inventory, the nonattainment year inventory in this redesignation package, is now being presented as Michigan's 8-hour ozone baseline inventory to meet the baseline SIP inventory requirement. This nonattainment inventory is the 2005 base M inventory compiled for the Lake Michigan Air Directors Consortium (LADCO) planning efforts. Onroad mobile emissions inventories were prepared by the Southeast Michigan Council of Governments (SEMCOG).

Michigan's SIP contains all required emission control programs related to ozone under Section 110 of the CAA. Programs for emissions limitations, permitting,

emissions inventories and statements, emission fees, enforcement authorities, and ambient monitoring have been implemented in Michigan and are included in the SIP.

Michigan has met all Section 172, Part D requirements relevant to this redesignation.

5. DEMONSTRATION OF IMPROVEMENT IN MICHIGAN'S AIR QUALITY

Improvement in air quality must be reasonably attributed to emissions reductions of the ozone precursor pollutants nitrogen oxides (NOx) and volatile organic compounds (VOCs) that are permanent and enforceable. An examination of NOx and VOC emissions from a period of nonattainment (2005) to attainment (2007) indicates a decline in overall emissions during this time period. The source of the emissions data is the MDEQ 2005 Emissions Inventory processed by LADCO to yield summer day county totals (base M). Both nonroad and onroad emissions were calculated specifically for 2005 using the latest version of the Mobile and National Mobile Inventory Model models. Details regarding this data are included in **Appendices A** and **B**. **Table 5.1** identifies emission reductions by source category for the subject counties. Both VOC and NOx emissions decreased from 2005 to 2007 for the Southeast Michigan area.

Table 5.1: Southeast Michigan Emission Reduction Demonstration Inventories for 2005 and 2007

All units are in tons per summer weekday

VOC EMISSIONS						
COUNTY	YEAR	POINT TOTAL	AREA TOTAL	ONROAD	NONROAD	TOTAL
Livingston	2005	0.66	11.92	5.00	9.61	27.19
	2007	0.86	8.94	4.40	9.07	23.27
Macomb	2005	9.62	38.72	16.50	23.12	87.96
	2007	10.72	36.09	13.80	21.96	82.57
Monroe	2005	11.16	9.85	5.20	9.56	35.77
	2007	9.41	9.92	4.50	9.02	32.85
Oakland	2005	9.80	55.34	34.00	46.35	145.49
	2007	9.03	55.39	28.50	44.15	137.07
St. Clair	2005	5.55	5.20	4.70	11.35	26.80
	2007	4.99	6.92	3.90	10.86	26.67
Washtenaw	2005	1.42	17.23	10.30	12.47	41.42
	2007	1.82	16.70	8.80	11.88	39.20
Wayne	2005	24.27	82.11	50.40	39.97	196.75
	2007	21.67	79.20	41.80	38.63	181.30
SEMCOG Total	2005	62.48	220.37	126.10	152.43	561.38
	2007	58.50	213.16	105.70	145.57	522.93
Lenawee	2005	1.21	8.89	2.70	4.37	17.17
	2007	1.28	6.05	2.10	4.13	13.56
NAA Total	2005	63.69	229.26	128.80	156.80	578.55
	2007	59.78	219.21	107.80	149.70	536.49

Table 5.1, Continued: Southeast Michigan Emission Reduction Demonstration Inventories for 2005 and 2007

All units are in tons per summer weekday

NOx EMISSIONS						
COUNTY	YEAR	POINT TOTAL	AREA TOTAL	ONROAD	NONROAD	TOTAL
Livingston	2005	1.89	1.00	16.20	4.38	23.47
	2007	2.55	0.79	13.50	3.97	20.81
Macomb	2005	2.30	2.36	40.60	19.27	64.53
	2007	2.39	3.87	33.10	17.00	56.36
Monroe	2005	104.83	0.93	16.40	7.69	129.85
	2007	65.79	0.73	13.60	6.91	87.03
Oakland	2005	3.10	4.19	88.90	25.52	121.71
	2007	3.36	6.07	72.60	22.85	104.88
St. Clair	2005	68.97	0.67	11.60	7.83	89.07
	2007	65.99	0.89	9.50	7.08	83.46
Washtenaw	2005	3.82	0.97	30.90	9.99	45.68
	2007	3.55	1.47	25.60	8.93	39.55
Wayne	2005	63.11	5.38	130.80	45.09	244.38
	2007	65.19	8.58	105.90	40.27	219.94
SEMCOG Total	2005	248.02	15.50	335.40	119.77	718.69
	2007	208.82	22.40	273.80	107.01	612.03
Lenawee	2005	0.37	0.73	5.30	3.54	9.94
	2007	0.35	0.55	4.40	3.32	8.62
NAA Total	2005	248.39	16.23	340.70	123.31	728.63
	2007	209.17	22.95	278.20	110.33	620.65

Reductions in emissions between 2005 and 2007 can be attributed to state, regional, and federal emissions control programs. In June 2005, the state submitted its ozone attainment strategy for Southeast Michigan to the EPA. This strategy included three control measures. Two of these measures, lower vapor pressure gasoline (7.0 RVP) and reduced hydrocarbon emissions in consumer and commercial products used in Michigan, were implemented in early 2007. These measures have produced significant local emission reductions, particularly to the onroad mobile emissions inventory. The third measure, reduction of hydrocarbon emissions from a cement manufacturing in Monroe County, was set to take effect by the summer of 2009. However, the company has recently announced that it will be closing its Monroe facility

in early 2009 due to economic conditions. If this facility is reopened, hydrocarbon emission reductions will be imposed.

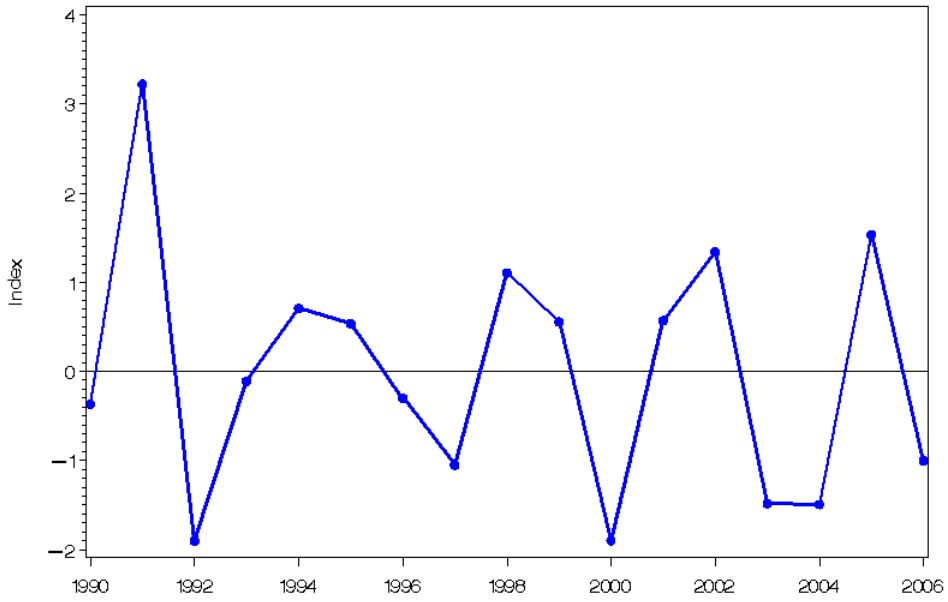
In addition to local and state controls, the Federal Motor Vehicle Control Program has produced significant emission reductions from onroad and nonroad motor vehicles throughout the country. Phase-in of federal "Tier 2" standards began in 2004. Standards for light-duty passenger vehicles standards, including sport utility vehicles, minivans, and pickup trucks; gasoline sulfur content regulations; nonroad diesel engine standards; and heavy-duty diesel vehicles all contributed to a reduction in emissions of NOx and VOCs. These reductions are permanent and enforceable and have contributed to the overall improvement in ozone levels. Additionally, electric generating units (EGUs) in Southeast Michigan have reduced emissions of NOx due to the Acid Rain program and the NOx SIP Call.

Actual ozone levels, adjusted for meteorological conduciveness, are another indicator of overall improvement in air quality. Ozone trend analysis is complicated by the dependence of ozone formation on meteorology, including temperature, dewpoint, pressure, relative humidity, solar radiation, cloud cover, morning and afternoon mixing height, wind direction, wind speed, lake breeze indicator, as well as conditions and changes from the previous day. To discern trends in ozone concentrations, the data can be adjusted to remove the impact from meteorological confounders. LADCO used a statistical technique, called Classification and Regression Tree (CART) analysis, to partition ozone values into various categories of ozone conducive meteorology. This determined the ozone-forming potential of each year's meteorology.[1]

[1] Kenski, Donna, CART Analysis for Ozone Trends and Meteorological Similarity, LADCO, May 10, 2007.

Figure 5.1 shows that the years 2005, 2002, 2001, 1998, 1999, 1995, 1994, and 1991 were more conducive for ozone formation than the average.

Figure 5.1: CART Index of Ozone Conduciveness, Detroit

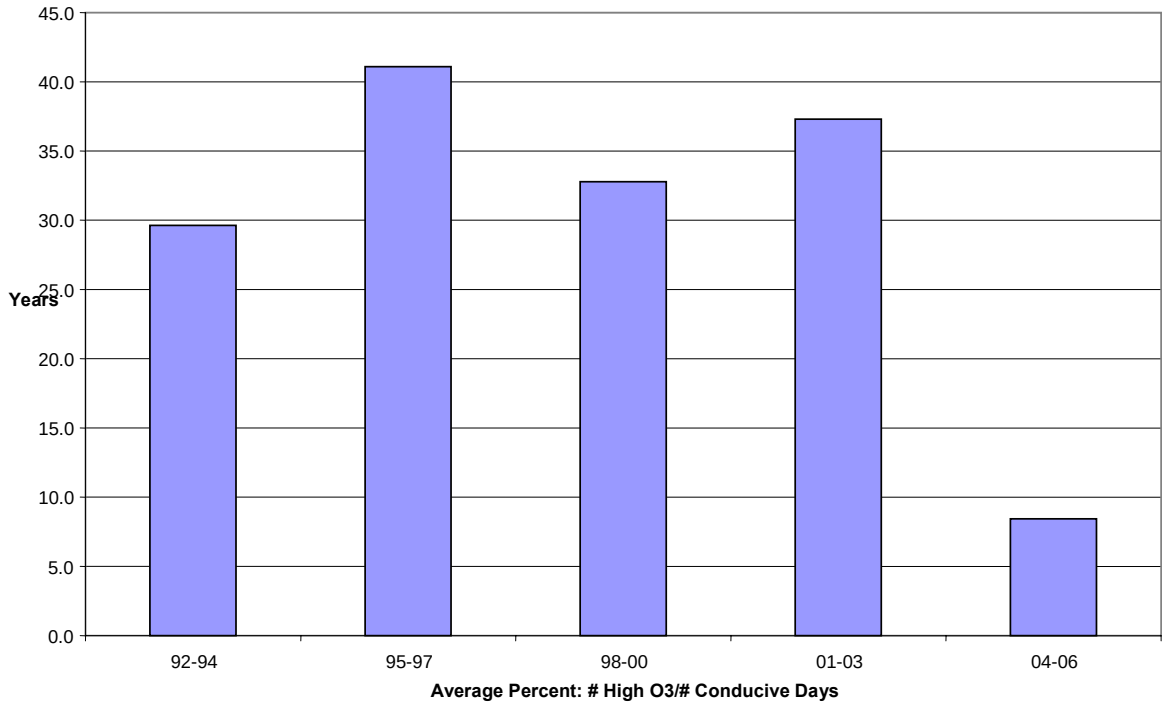


Index represents fraction of ozone conducive days in each year, above or below 1990–2006 average
1= twice as many days as average year, −1= half as many days as average year

The MDEQ divided the number of days in which 8-hour ozone values were elevated at ambient air quality monitors by the number of days with conducive meteorology. The ratios were converted to percentages to increase clarity. This analysis revealed that 46 percent of the ozone-conducive days in 1992 had elevated levels of ozone. In 2006, only 4 percent of the days with conducive conditions had high ozone values. Because there is year-to-year fluctuation, an average of the percent of high ozone days over three years was calculated. This removed some of the uncertainty inherent in the yearly results. **Figure 5.2** shows that during the period 1992 to 2003, 30 to 40 percent of ozone conducive days formed elevated ozone, but during the period 2004 to 2006, the percentage drops to 8.

Ozone concentrations in 2005 were moderate despite better than average ozone-conducive meteorology. In 2006, ozone concentrations were much lower compared to days with similar conditions in years past. The year 2006 was the second lowest ozone concentration year in the last 27 years despite having warmer than average temperatures, moderate wind speeds, and high solar radiation. The LADCO CART analysis and the MDEQ analysis of number of high ozone concentrations on meteorologically conducive days reinforces the demonstration that decreases in precursor emissions have led to actual improvements in air quality.

Figure 5.2: Tendency to Generate Elevated Ozone: Average Percent for Number of Elevated Days/Number of Conducive Days



6. MAINTENANCE PLAN

A maintenance plan must demonstrate continued attainment for at least ten years after approval of redesignation. Section 175A of the CAA sets forth the elements of a maintenance plan for areas seeking redesignation from nonattainment to attainment. Eight years after the redesignation, a revised maintenance plan for the next ten years must be submitted to the EPA. To address the possibility of future NAAQS violations, the maintenance plan must contain contingency measures.

Future attainment is demonstrated through emission inventory projections. This demonstration includes an attainment year inventory for 2007, an interim year inventory for 2009, and a projected maintenance inventory for 2020. The future year 2020 inventories of VOC and NOx emissions are shown to remain below attainment year 2007 emissions levels to assure that local contribution to ozone formation will not exceed current levels. Continuing reductions in ozone precursor emissions will be realized from fleet turnover, Maximum Achievable Control Technology (MACT) standards for hazardous air pollutants, federal diesel emissions programs, and diesel strategies implemented for attainment of the fine particulate matter ($PM_{2.5}$) NAAQS. Additional emissions reductions of NOx and VOC are scheduled to occur during the maintenance period due to new controls on steel sources in Southeast Michigan. Additionally, NOx reductions will be realized through retrofits on locomotive switch engines, the Clean School Bus program, and the Michigan Clean Diesel Initiative. The Wayne County Metropolitan Airport will reduce operational emissions through initiatives taken through the Voluntary Airport Low Emissions program. The introduction of less volatile summertime gasoline, and less volatile consumer and commercial products statewide, starting in 2007, have also produced

continuing VOC reductions. Reductions in NOx emissions from the federal Clean Air Interstate Rule (CAIR) can be assumed in future years and are factored into the 2009 EGU sector total for NOx. Due to the uncertainty of the legal status of CAIR at this time, a conservative 2020 future year inventory was prepared without CAIR NOx reductions. The maintenance plan inventory emissions totals for VOC and NOx are provided in **Table 6.1**.

Table 6.1: Maintenance Plan Emission Inventories for 2007, 2009, and 2020

All units are in tons per day

VOC Emissions						
COUNTY	YEARS	POINT TOTAL	AREA TOTAL	ONROAD	NONROAD	TOTAL
Livingston	2007	0.86	8.94	4.40	9.07	23.27
	2009	0.96	7.69	3.90	8.19	20.74
	2020	1.26	8.24	2.30	5.87	17.67
Macomb	2007	10.72	36.09	13.80	21.96	82.57
	2009	9.51	34.56	12.20	18.66	74.93
	2020	10.27	35.14	6.50	14.46	66.37
Monroe	2007	9.41	9.92	4.50	9.02	32.85
	2009	8.42	9.99	4.00	8.72	31.13
	2020	9.89	10.67	2.20	6.84	29.60
Oakland	2007	9.03	55.39	28.50	44.15	137.07
	2009	7.30	54.52	25.20	37.95	124.97
	2020	7.44	57.45	13.20	28.26	106.35
St. Clair	2007	4.99	6.92	3.90	10.86	26.67
	2009	4.39	7.53	3.50	10.32	25.74
	2020	5.44	8.00	2.00	8.52	23.96
Washtenaw	2007	1.82	16.70	8.80	11.88	39.20
	2009	1.84	16.26	7.90	10.41	36.41
	2020	2.41	17.06	4.40	8.13	32.00
Wayne	2007	21.67	79.2	41.80	38.63	181.30
	2009	18.77	76.55	36.60	33.16	165.08
	2020	20.98	78.13	18.80	27.19	145.10
SEMCOG Total	2007	58.50	213.16	105.70	145.57	522.93
	2009	51.20	207.10	93.30	127.41	479.01
	2020	57.69	214.69	49.40	99.27	421.05
Lenawee	2007	1.28	6.05	2.10	4.13	13.56
	2009	1.28	4.85	1.80	3.80	11.73
	2020	1.68	4.87	0.90	2.73	10.18
NAA Total	2007	59.78	219.21	107.80	149.70	536.49
	2009	52.48	211.95	95.10	131.21	490.74
	2020	59.37	219.56	50.30	102.00	431.23

Table 6.1: Maintenance Plan Emission Inventories for 2007, 2009, and 2020 (continued)

All units are in tons per day

NOx Emissions						
COUNTY	YEARS	POINT TOTAL	AREA TOTAL	ONROAD	NONROAD	TOTAL
Livingston	2007	2.55	0.79	13.50	3.97	20.81
	2009	2.81	0.71	11.10	3.70	18.32
	2020	2.88	0.74	3.50	1.96	9.08
Macomb	2007	2.39	3.87	33.10	17.00	56.36
	2009	2.39	4.54	27.10	15.27	49.30
	2020	2.71	4.84	8.60	8.51	24.66
Monroe	2007	65.79	0.73	13.60	6.91	87.03
	2009	34.67	0.65	11.20	6.27	52.79
	2020	70.45	0.68	3.50	4.56	79.19
Oakland	2007	3.36	6.07	72.60	22.85	104.88
	2009	3.87	6.94	59.10	20.79	90.70
	2020	4.44	7.33	17.80	11.16	40.73
St. Clair	2007	65.99	0.89	9.50	7.08	83.46
	2009	72.87	0.99	7.80	6.54	88.20
	2020	71.25	1.04	2.60	5.40	80.29
Washtenaw	2007	3.55	1.47	25.60	8.93	39.55
	2009	3.16	1.70	21.00	8.27	34.13
	2020	3.71	1.80	6.60	3.82	15.93
Wayne	2007	65.19	8.58	105.90	40.27	219.94
	2009	62.43	10.02	85.50	36.84	194.79
	2020	69.54	10.56	25.40	25.11	130.61
SEMCOG Total	2007	208.82	22.40	273.80	107.01	612.03
	2009	182.20	25.55	222.80	97.68	528.23
	2020	224.98	26.99	68.00	60.52	380.49
Lenawee	2007	0.35	0.55	4.40	3.32	8.62
	2009	0.36	0.49	3.60	3.12	7.57
	2020	0.36	0.49	1.30	1.77	3.92
NAA Total	2007	209.17	22.95	278.20	110.33	620.65
	2009	182.56	26.04	226.40	100.80	535.80
	2020	225.34	27.50	69.30	62.29	384.43

A comprehensive baseline emissions inventory was prepared by MDEQ and SEMCOG for the year 2005. The inventory was further processed by LADCO to produce summer day totals by county. Full documentation of methodologies and models used to derive emission inventories is contained in **Appendices A** and **B**. Future year inventories for 2009 and 2018 were prepared by LADCO and SEMCOG. SEMCOG also prepared a 2020 inventory for onroad emissions. For all other

categories, the MDEQ projected the 2020 inventory utilizing regression. NOx reductions from the federal CAIR are not included in the 2020 inventory.

Maintenance Commitments

Michigan will develop and submit to the EPA, no later than eight years after approval of this redesignation request, a new maintenance plan covering the next ten-year period.

The MDEQ will continue to track ozone levels through the operation of an EPA-approved monitoring network as necessary to demonstrate ongoing compliance with the NAAQS. Data will be entered into the Air Quality System (AQS) on a timely basis in accordance with federal regulations. The MDEQ will continue to produce periodic emission inventories as required by the federal Consolidated Emissions Reporting Rule (40 CFR, Part 51) to track future levels of emissions. The control measures for VOC and NOx emissions that were contained in the SIP before redesignation of these areas to attainment shall be retained as required by Section 175A of the CAA.

Michigan will expeditiously enact legal authorities needed for additional contingency control measures, and/or studies of conditions resulting in unexpected ozone increases in response to identified triggering events.

Action Level Response

An Action Level Response will be prompted when a two-year average fourth high monitored value of 0.085 ppm or higher occurs within a maintenance area. A review of circumstances leading to the high monitored values will be conducted if this response is triggered. The MDEQ will explore whether a special event, malfunction, or noncompliance with permit conditions resulted in high ozone levels in order to

immediately address corrective measures. The MDEQ will also review meteorological conditions during high ozone episodes. This review will be conducted within six months following the close of the ozone season. If the MDEQ determines that contingency measure implementation is necessary to prevent a future violation, the MDEQ will select and implement a measure that can be implemented promptly.

Contingency Measure Response

If a violation of the ozone NAAQS occurs, Michigan will select one or more control measures from the following list of potential contingency measure options for implementation. The timing for implementation of a contingency measure is dependent on the process needed for legal adoption and source compliance, which varies for each measure. Some potential measures/controls have already been promulgated and are scheduled to be implemented at the federal or state levels. Other measures will need state administrative rulemaking or legislative approval. The MDEQ will seek to expedite the process of securing enabling authority and implementing the selected measures as needed to reduce ozone levels, with a goal of having measures in place as expeditiously as practicable, and within 18 months after state certification of the violation. Opportunity for public participation in the contingency measure response will be provided. The MDEQ will submit the identified enforceable contingency measures to the EPA as revisions to the SIP as needed.

List of Potential Contingency Measures

1. Reduced VOC content in Architectural, Industrial, and Maintenance (AIM) coatings rule.
2. Auto body refinisher self-certification audit program.
3. Reduced VOC degreasing/solvent cleaning rule.

4. Diesel retrofit program.
5. Reduced idling program.
6. Portable fuel container replacement rule.
7. Food preparation flame broiler control rule.

7. TRANSPORTATION CONFORMITY BUDGETS

Transportation conformity is required by Section 176(c) of the CAA. Transportation plans, programs, and projects must conform to the applicable SIP. The federal transportation conformity rule established the criteria and procedures for determining whether or not conformity is met. Conformity to a SIP means that transportation activities will not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

Estimates of onroad motor vehicle emissions from cars, buses, and trucks driven on public roadways are projected for the maintenance period to assess emission trends and to ensure continued compliance with the ozone NAAQS. These estimates are considered a ceiling or "budget" for emissions and are used to determine whether transportation plans and projects conform to the SIP. Estimated onroad mobile emissions of VOC and NOx must not exceed the emission budgets contained in the maintenance plan. The emissions estimates for this sector reflect appropriate and up-to-date assumptions about vehicle miles traveled, socioeconomic variables, fuels used, weather inputs, and other planning assumptions. Onroad emissions have been projected to 2020 in the maintenance inventory.

Typically, the formula for calculating maintenance conformity budgets is:

Onroad emissions inventory for maintenance year + safety margin

Where:

safety margin = 90% of emissions reduction from all sources between the attainment year and the maintenance year.

However, the general rule is not to let conformity budgets exceed the total onroad emissions from the attainment year inventory (2007). **Table 7.1** shows the

conformity budgets resulting from the conformity budget formula. In all cases, the calculated budgets are higher than the attainment year emissions inventory. Therefore, the final budgets will be set equal to the 2007 onroad emissions inventory. These values are shown in **Table 7.2**.

Table 7.1: Motor Vehicle Emissions Budget Calculation

In Tons per Day

SEMCOG REGION: (LIVINGSTON, MACOMB, MONROE, OAKLAND, ST. CLAIR, WASHTENAW, AND WAYNE COUNTIES)						
		POINT TOTAL	AREA TOTAL	ONROAD	NONROAD	TOTAL
VOC	2007	59	213	106	146	523
	2020	58	215	49	99	421
	Emissions Reduction					102
	Safety Margin					92
	Conformity Budget					**141**
NOx	2007	209	22	274	107	612
	2020	225	27	68	61	380
	Emissions Reduction					232
	Safety Margin					208
	Conformity Budget					**276**
LENAWEE COUNTY						
VOC	2007	1.3	6.1	2.1	4.1	13.6
	2020	1.7	4.9	0.9	2.7	10.2
	Emissions Reduction					3.4
	Safety Margin					3.0
	Conformity Budget					**3.9**
NOx	2007	0.4	0.6	4.4	3.3	8.6
	2020	0.4	0.5	1.3	1.8	3.9
	Total Reduction					4.7
	Safety Margin					4.2
	Conformity Budget					**5.5**

Table 7.2: Final Motor Vehicle Emissions Budgets

In Tons per Day

SEMCOG REGION	VOC	NOx
Calculated Budget = 2020 Onroad Emissions + Safety Margin	141	276
Attainment Year Emissions (2007)	106	274
Final Budget	106	274
LENAWEE COUNTY		
Calculated Budget = 2020 Onroad Emissions + Safety Margin	3.9	5.5
Attainment Year Emissions (2007)	2.1	4.4
Final Budget	2.1	4.4

8. Public Hearing Requirements

In accordance with Section 110 (a) (2) of the CAA, public participation in the SIP process was provided as follows (see **Appendix C**):

Notice of availability of the ozone redesignation documents and notice of the public hearing and comment period were posted on the MDEQ website at http://www.Michigan.gov/deqair and on the MDEQ calendar website at http://www.Michigan.gov/deqcalendar.

The public hearing for this redesignation request, including the baseline emissions inventory for VOC and NOx and the maintenance plan SIP revision was to be held on January 27, 2009, at Constitution Hall in Lansing, Michigan if a hearing was requested by January 21, 2009. The MDEQ did not receive a hearing request and the tentative public hearing was cancelled. In addition, no comments were received during the public comment period.

Appendix A: Ozone Redesignation Emissions Inventory Support Documentation

for

Southeastern Michigan: Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

1. Introduction

Emissions inventory documentation support for the Maintenance Plan emissions inventory in the Ozone Maintenance Plan for Southeast Michigan is provided in this appendix. An inventory was prepared for all counties in Michigan but this document pertains to the counties of Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne. Mobile estimates for the nonattainment counties were prepared by the Southeast Michigan Council of Governments (SEMCOG) and appear in **Appendix B**. Except where indicated, the summer day emissions described here represent the Midwest Regional Planning Organization's (MRPO) typical summer weekday. The Lake Michigan Air Director's Consortium (LADCO) is the MRPO. The meteorological conditions on July 12, 2005, which occurred during a significant ozone episode, were chosen to represent the typical summer day for 2005 and for future year projections. The future year projections take into account existing control measures and measures that are known to be on the way. These inventories are taken from the LADCO base M inventories.

In a related effort, the 2005 Michigan statewide inventory was submitted to the U.S. Environmental Protection Agency (EPA) by the Michigan Department of Environmental Quality (MDEQ) pursuant to 40 Code of Federal Regulation (CFR) Part 51, Subpart A – Emissions Inventory Reporting Requirements.

2. EGU Point Sources

2.1 2005 EGU Point Source Methodology

The 2005 electric generating unit (EGU) point source data originated with annual emissions data provided to MDEQ via the Michigan Air Emissions Reporting System (MAERS). Temporal allocation was performed by emission unit, month, day of week, and hour using the procedures described in Temporally Allocating Emissions with Continuous Emissions Monitoring (CEM) Data for Chemical Transport and SIP Modeling.[2]

In addition to the heat input based temporal profiles described in the paper, separate temporal profiles were developed based on CEM reported emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2) and these profiles were used instead of heat input to temporalize annual emissions of the respective pollutants. The CEM data used as the basis of the profiles was that of 2004 through 2006, obtained from the EPA Clean Air Markets Division (CAMD).[3]

2.2 Growing EGU Point Source to 2009

The 2009 data is obtained from the Integrated Planning Model (IPM) results obtained by the EPA and converted to a modeling inventory by LADCO. The

[2] These procedures can be found at http://www.epa.gov/ttn/chief/conference/ei15/session4/edick.pdf.
[3] The CEM data is available from the CAMD's website at http://www.epa.gov/camddataandmaps/.

following is a LADCO IPM discussion that details the methodologies used to project EGU emissions to 2009 using results from the IPM model. [4]

Specifically, future year emissions are based on EPA IPM 3.0 modeling.[5] Three CAIR scenarios were addressed:

1. Round 5a: EPA IPM 3.0 was assumed as the future year base for EGUs.
2. Round 5b: EPA IPM 3.0, with several "will do" adjustments identified by the States. These adjustments should reflect a legally binding commitment (e.g., signed contract, consent decree, or operating permit).
3. Round 5c: EPA IPM 3.0, with several "may do" adjustments identified by the States. These adjustments reflect less rigorous criteria, but should still be some type of public reality (e.g., Best Available Retrofit Technology determination or press announcement).

Inter-RPO IPM Global Parameter Decisions (May 11, 2005):

The following summarizes the decisions made by the Visibility Improvement State and Tribal Association of the Southeast, MRPO, Central Regional Air Planning Association, and the Mid-Atlantic/Northeast Visibility Union, for the global assumptions to be used in EGU forecasting with IPM. These decisions and changes are made to the EPA IPM 2.1.9 assumptions.[6]

A. Market Assumptions
   1. National Electricity and Peak Demand - *Decision*: Use unadjusted Energy Information Agency (EIA) Annual Energy Output (AEO) 2005 national electricity and peak demand values.
   2. Regional Electricity and Demand Breakout - *Decision:* Use the existing IPM region breakdown as conducted in earlier modeling.
   3. Natural Gas Supply Curve and Price Forecast - *Decision:* Take existing supply curves and scale application to EIA AEO 2005 price point. In this approach, the EPA IPM 2.1.9 gas supply curves will be scaled in such a manner that IPM will solve for AEO 2005 gas prices when the power sector gas demand, in IPM, is consistent with AEO 2005 power sector gas demand projections. In instances where the power sector gas demand in IPM is lower than that of AEO 2005 projections, IPM will project gas prices that are lower than that in AEO 2005 and vice versa.
   4. Oil Price Forecast - *Decision:* Use EIA AEO 2005 values.
   5. Coal Supply and Price Forecast - *Decision:* Take existing supply curves and scale application to EIA AEO 2005 price points, coal supply regions, and coal grades. In this approach, the coal supply curves used in EPA's IPM 2.1.9 are scaled in such a manner that the average mine mouth coal prices that the IPM is solving in aggregated coal

[4] LADCO IPM info is at http://www.ladco.org/tech/emis/r5/web/ptcyemis.050715.r5s1_egu5a_2010.lst.
[5] EPA IPM 3.0 modeling is found at http://www.epa.gov/airmarkets/progsregs/epa-ipm/index.html.
[6] EPA IPM 2.1.9 assumptions can be referenced at http://www.epa.gov/airmarkets/progsregs/epa-ipm/past-modeling.html.

supply regions are comparable to AEO 2005. Due to the fact that the coal grades and supply regions between AEO 2005 and the EPA IPM 2.1.9 are not directly comparable, this is an approximate approach and has to be performed in an iterative fashion. This approach does not involve updating the coal transportation matrix with EIA assumptions due to significant differences between the EPA IPM 2.1.9 and EIA AEO 2005 coal supply and coal demand regions.

B. Technical Assumptions
   1. Firmly Planned Capacity Assumptions - *Decision:* Use revisions and new data as provided by Regional Planning Organizations and stakeholders.
      Decision: Allow North Carolina Clean Smokestacks 2009 data as provided to define "must run" units.
   2. Pollution Control Retrofit Cost and Performance [SO_2, NOx, and mercury] - *Decision:* Retain pollution control retrofit cost and performance values.
   3. New Conventional Capacity Cost And Performance Assumptions - *Decision:* Use EIA AEO 2005 cost and performance assumptions for new conventional capacity.
      Decision: Retain existing EPA IPM 2.1.9 framework cost and performance for new renewable capacity.
      Decision: Exclude constraint on new capacity type builds (i.e., no new coal).
   4. SO_2 Title IV Allowance Bank - *Decision:* Use existing SO_2 allowance bank value (4.99 million tons) for 2007.
   5. Nuclear Relicensing and Uprate - *Decision:* Use existing IPM configuration with updated EIA AEO 2005 (~$27/kW) incurrence cost for continued operation.

C. Strategy Assumptions
   1. Clear Air Mercury Rule (CAMR) - *Decision:* Include CAMR in future rounds of IPM modeling.
   2. Renewable Portfolio Standards - *Decision:* Model Renewable Portfolio Standards (RPS) based on the most recent Regional Greenhouse Gas Initiative documentation using a single RPS region for Massachusetts, Rhode Island, New York, New Jersey, Maryland and Connecticut. The RPS requirements within these states can be met by renewable generation from New England, New York, and PJM Interconnection. EPA IPM 2.1.9 methodology and hardwired EIA AEO 2004 projected renewable builds for the remainder of the country.

D. Other Assumptions
   1. Run Years - *Decision:* Revise runs years to 2008 (2007-08), 2009 (2009), 2012 (2010-13), 2015 (2014-17), 2018 (2018), 2020 (2019-22), and 2026 (2023-2030).

2. Canadian Sources - *Decision:* Utilize existing EPA IPM 2.1.9 configuration (no Canadian site specific sources).

2.3 Updated 2005 EGU Point Source, 2007 EGU Point Source and Interpolating the 2020 EGU Point Source Methodology for the Ozone Redesignation SIP

The 2005 and 2007 EGU point NOx data are from the Michigan quarterly CEM data files for 2005 and 2007, accessed September 24, 2008, and July 15, 2008, respectively. [7]

To address concerns about projected effects of the CAIR rule, 2007 CEM-based data was grown using growth factors for the East Central Area Reliability Coordination Agreement region, applied by fuel type. The 2009 EGU data, which assumes CAIR controls, is based on IPM modeling from the LADCO Base M/Round5. No additional control beyond that already reflected in the 2007 CEM data was applied to the 2020 projections. The growth factors used were those from the supplemental table in Electricity Generation & Renewable Resource, which accompanies the EIA's 2008 Annual Energy Outlook.[8]

As VOC emissions are not part of the CEM data, the same approach was taken for EGU VOC as for non-EGU VOC. For each county and pollutant, a linear regression analysis was performed using as inputs the values from the established inventories for 2002, 2005, 2009, and 2018. From the best-fit line established by the regression analysis, values for 2007 and 2020 were derived.

3. Non-EGU Point Sources

3.1 2005 Non-EGU Point Source Methodologies

The 2005 point source data have as their original sources the 2005 Michigan point source emission inventory. This section of the document describes the compilation and processing of point source emission data submitted to comply with the Consolidated Emission Reporting Rule (CERR) for the EPA National Emission Inventory (NEI) 2005 inventory.

The data originates with the entry of data by the reporting facilities into the MAERS. The electronic data received from the reporting facilities is reviewed and compiled by the MDEQ, and exported to the fixed-width text version of the National Inventory Format (NIF). After the exported data is loaded into a PostgreSQL database patterned after the Microsoft Access version of the NIF, the following processing steps and checks are performed.

Both emissions estimated by default calculations in MAERS and any emissions reported by facility operators are maintained in MAERS. For evaluation and quality assurance purposes, both types of records are included in the exports. To avoid

[7] The CEM data files were downloaded from ftp://ftp.epa.gov/dmdnload/emissions/hourly/quarterly,
[8] AEO supplemental table information is found at http://www.eia.doe.gov/oiaf/aeo/supplement/index.html.

double-counting, where a specific process/pollutant has emission records both reported directly by the facility operator, and estimated via MAERS calculations, the latter are excluded.

Portable facilities, such as asphalt plants, report total throughput and emissions, plus operating percentages for each county in which the portable facility was located during the year. From this information, records are generated for each county of operation, and throughput and emissions are apportioned based on the operating percentages reported by county and process. As geographic coordinates for all operating sites are not reported, coordinates corresponding to the centers of the counties of operation are assigned.

As attention has shifted from total particulate to PM_{10} and $PM_{2.5}$, total particulate records are excluded from the reporting requirements.

Over 99.8 percent of total criteria emissions are accounted for by emissions reported by operator; therefore, exported criteria emissions estimated via MAERS calculations are excluded.

In the site table, where strFacilityCategory is not set in the export, it is set to "01."

Mandatory geo-coordinate fields were added to the NIF specifications released in December 2003, well after it would have been possible to collect this information from the reporting facilities for 2002 operations. The following values were deemed most often representative and the exported data are updated accordingly for 2002 data:

"strHorizontalCollectionMethodCode" is set to '027'
"strHorizontalAccuracyMeasure" is set to '2000'
"strHorizontalReferenceDatumCode" is set to '001'
"strReferencePointCode" is set to '106'

For 2005, these geographic data elements were requested of the facilities. The defaults above were applied only where data was not provided by the facility.

MAERS tracks emissions of some pollutants that are of interest to the Great Lakes Commission, but which do not have corresponding pollutant codes in the most recent NIF pollutant code table. Emission records for the following pollutant codes are excluded:

7440508; 8052413; DICDD,TOT; DICDF,TOT; HYDFLUORO; PERFLUORO; TRICDD,TO; TRICDF,TO; CH4; CO2; N20; 117840; 7783064.

Emission records for ammonia (NH_3) are exported with the Chemical Abstract Service (CAS) number 7664417, rather than the pollutant code NH_3. These pollutant codes are updated to NH_3. Likewise, records exported with pollutant codes polynuclear aromatic hydrocarbon and polycyclic organic matter are updated to pollutant codes 234 and 246, respectively.

All criteria and hazardous air pollution emissions are reported at the process level, and the export routines reflect that in the strEmissionDataLevel field of the emission table. This field is set to null for criteria pollutant emission records per EPA guidance.

All emissions are exported as pounds of annual emissions. The EPA guidance suggests that criteria pollutant emission be reported in tons. The field strEmissionUnitNumerator is changed to TON and the filed dblEmissionNumericValue is divided by two000 for criteria pollutant emission records.

Null values in the quarterly throughput fields of process records are set to zero. Where quarterly throughput fields of process records sum to zero, throughput percentages are set to 25 percent for each quarter.

MAERS recognizes a control device code of '909' for a "Roll Media Fiberglass Tack Filter (Tacky 1 side)," which is not recognized in the NIF code tables. Where this control device code is exported, the "strPrimaryDeviceTypeCode" field of the control equipment table is updated to a value of 058.

Because of the exclusion of emission records as described above, referential integrity of the exported data can be compromised. At this point, it is re-established by deleting records stepwise, in the following order.

CE records without corresponding EM records
PE records without corresponding EM records
EP records without corresponding EM records
ER records without corresponding EP records
EU records without corresponding EP records
SI records without corresponding EU records

The data are then checked again for referential integrity and mandatory fields and then loaded into the Microsoft Access shell version of the NIF via append queries that connect to the PostgreSQL data tables via ODBC. The Basic Content and Format Checker is run and its output is reviewed. Where corrections are needed to assure consistency among data sources, the corrections are made in the MAERS and a full iteration of the export and post-processing steps are performed.

The 2005 point source inventory was incorporated into the LADCO Base M inventory and serves as the basis for Michigan's 2005 CERR submittal.

3.2 Growing Stationary Non-EGU Point, Stationary Area, Locomotive, Shipping, and Aircraft Categories to 2009 and 2018

The 2009 and 2018 emissions are based on work and a follow-up report (E.H. Pechan & Associates, Inc., Development of Growth and Control Factors for Lake Michigan Air Directors Consortium, Final Report, December 14, 2004) done by Pechan. This work supports LADCO's efforts to forecast anthropogenic emissions for the purpose of assessing progress for air quality goals, including goals related to

regional haze and attainment of the ozone NAAQS. The Pechan growth factors were used to estimate the LADCO base M future year emissions posted by LADCO in 2007. The future year emissions represent both emission controls that already exist and those that are known to be on the way.

To assess progress for attaining air quality goals, LADCO requires emission activity growth and control data to forecast emissions from a 2005 base-year inventory to several future years of interest. These future years include 2009, 2012, and 2018 (e.g., 2018 is the first milestone for regional haze reasonable progress demonstrations). Pechan prepared emission control factors to support forecasting for each of these years. Because the incremental level of effort required to develop emission activity growth factors for each year over the 2003-2018 period was nominal, Pechan prepared non-EGU point and area and nonroad source growth factors for each year over this entire period.

The Pechan Development of Growth and Control Factors For Lake Michigan Air Directors Consortium (LADCO) report describes Pechan's efforts to develop emission growth and control data to support future year air quality modeling by LADCO.[9] The report is organized into a background chapter and:

Chapter II, which describes the development of the emission activity growth data;
Chapter III, which discusses how the emission control data were compiled;
Chapter IV, which describes the preparation of the growth and control factor files;
Chapter V, which identifies projection issues for future consideration; and
Chapter VI, which presents the references consulted in preparing this report.

For sectors non-EGU point source, stationary area source, and marine, air, rail source sectors, the future year emissions for the LADCO States were derived by applying growth and control factors to the base year inventory. As stated above, these factors were developed by Pechan. Growth factors were based initially on Economic Growth and Analysis System (version 5.0), and were subsequently modified (for select, priority categories) by examining emissions activity data.

Additional information on the procedures used to project emissions can be found in the "Regional Air Quality Analyses for Ozone, $PM_{2.5}$, and Regional Haze: Technical Support Document, prepared by LADCO.[10]

3.3 Interpolating Stationary Non-EGU Point, Stationary Area, Nonroad, Locomotive, Shipping, and Aircraft Categories to 2007 and 2020.

For each combination of county and pollutant, a linear regression analysis was performed using as inputs the values from the established inventories for 2002,

[9] The Pechan report is available from the LADCO website at http://www.ladco.org/reports/rpo/emissions/growth_control_factors_base_k_2002_inventory_final_report_pechan.pdf.

[10] The LADCO technical support document is available at http://www.ladco.org/reports/technical_support_document/tsd/tsd_version_iv_april_25_2008_final.pdf.

2005, 2009 and 2018. From the best-fit line established by the regression analysis, values for 2007 and 2020 were derived.

4. Stationary Area Sources

4.1 2005 Stationary Area Source Emission Inventory

This section contains descriptions of the various area source categories that were inventoried for 2005, as well as the methodologies used to compile the emissions. The 2005 emissions inventory provided in this ozone attainment redesignation package is the base year inventory required for ozone NAAQS planning, and fulfills the VOC and NOx 3-year cycle update requirements of the federal Continuous Emissions Reporting Rule (CERR). Table 4.1 shows the air pollutants included in the emissions inventory requirements for the ozone and PM2.5 NAAQS, CERR, and regional haze regulations.

Table 4.1-1 shows the air pollutants that must be provided by the CERR, base-year inventories for 8-hour ozone and $PM_{2.5}$ NAAQS, and regional haze regulations.

Table 4.1-1: Required Air Pollutants Emissions

REGULATIONS	CO	NH_3	NOx	Pb	PM_{10}-PRI	PM_{25}-PRI	SO_X	VOC
CERR	√	√	√	√	√	√	√	√
Ozone NAAQS	√		√					√
$PM_{2.5}$ NAAQS		√	√		√	√	√	√
Regional haze		√	√		√	√	√	

In producing the 2005 emission inventory, multiple emission estimates were provided to reflect temporal resolution as required for base year inventories for the ozone and $PM_{2.5}$ NAAQS and base-year inventories for the ozone and $PM_{2.5}$ NAAQS and for the CERR. These requirements are summarized as follows in **Table 4.1-2**:

Table 4.1-2: Temporal Resolution Requirements for Inventories

REGULATIONS	STATEWIDE INVENTORY	SUMMER WEEKDAY
CERR	**Required**	
Ozone NAAQS	**Required**	**Required**
$PM_{2.5}$ NAAQS	**Required**	**Optional**
Regional haze	**Required**	**Optional**

The statewide year 2005 emission estimates that are being provided in **Table 4.1-3** reflect the annual and summer weekday for the referenced air pollutants. A list of the 30 area source categories appears on the following page. The EPA requires specific data elements to be provided via electronic data transfer using the NEI NIF Version 3.0 format. A description of data structures can be found in the EPA publication NEI Input Format Version 3.0 User's Guide Instructions and Conventions of Use, April 2003.

Table 4.1-3: Summary of Area Sources and Respective Air Pollutants Inventoried for 2005 Inventory

SEQ #	AREA SOURCE DESCRIPTION	SCCS	SIC	CO	NH_3	NOx	PM_{10}-PRI	PM_{25}-PRI	SO_X	VOC
1	Crude oil production	2310010000	1311							√
2	Natural gas production	2310020000	1311							√
3	Breweries	2302070001	2082							√
4	Cutback asphalts	2461021000	2951							√
5	Distilleries	2302070010	2085							√
6	Emulsified asphalts	2461022000	2951							√
7	Aircraft refueling	2275900000	4581							√
8	Commercial coal	2103002000	9999	√	√	√	√	√	√	√
9	Commercial distillate oil	2103004000	9999	√	√	√	√	√	√	√
10	Commercial kerosene	2103011005	9999	√	√	√	√	√	√	√
11	Commercial natural gas	2103006000	9999	√	√	√	√	√	√	√
12	Commercial residual oil	2103005000	9999	√	√	√	√	√	√	√
13	Gasoline marketing	2505030120, 2501060100, 2501060051, 2501060052, 2501060053, 2501060200	5541							√
14	Industrial coal	2102002000	3999	√	√	√	√	√	√	√
15	Industrial distillate oil	2102004000	3999	√	√	√	√	√	√	√
16	Industrial kerosene	2102011000	3999	√	√	√	√	√	√	√
17	Industrial natural gas	2102006000	3999	√	√	√	√	√	√	√
18	Industrial residual oil	2102005000	3999	√	√	√	√	√	√	√
19	Residential coal	2104001000	8811	√	√	√	√	√	√	√
20	Residential distillate oil	2104004000	8811	√	√	√	√	√	√	√
21	Residential kerosene	2104011000	8811	√	√	√	√	√	√	√
22	Residential natural gas	2104006000	8811	√	√	√	√	√	√	√
23	Residential propane	2199007000	8811	√		√	√	√	√	√
24	Municipal landfills	2620030000	4953	√		√	√	√		√
25	Vessel ballasting	2505020900	4432							√
26	Vessel loading	2505020120, 2505020030,2505020150, 2505020180, 2505020090, 2505020060	4432							√
27	Remedial action	2660000000	9511	√		√	√		√	√
28	Traffic marking paints	2401008000	1611							√
29	Wineries	2302070005	2084							√
30	Aviation stage I	2501080050	5541							√

4.2 Oil and Natural Gas Production

The oil and gas production area source category represents those VOC emissions that result from the exploration, drilling, and the field processing of crude oil and natural gas. Fugitive VOC emissions occur from control valves, relief valves, spills, pipe fittings, pump seals, and compressor seals in the production and field processing of crude oil and natural gas. Individual county crude oil and natural gas production data was obtained from the MDEQ, Geological and Land Management Division. VOC emission factors were derived from the EPA publication entitled: Revision of Evaporative Hydrocarbon Emission Factors (EPA – 450/3-76-039). The emission factors are 107 pounds of emitted VOC per thousand barrels of produced crude oil and 175 pounds of emitted VOC per million cubic feet of produced natural gas. For crude oil production, emission controls reflecting National Emissions Standards for Hazardous Air Pollutants (NESHAP) application of a 45 percent reduction in VOC were considered. This control level was based on EPA determination of an overall 45 percent reduction in VOC from oil and natural gas production facilities. This control reduction was obtained from a 5/14/99 EPA fact sheet that was published with the Final Air Toxics Rules for Oil and Natural Gas Production Facilities and Natural Gas Transmission and Storage Facilities. Rule effectiveness of 80 percent was then applied, and point source deductions were performed to estimate the area source contribution. For natural gas, emission controls from Michigan Air Pollution Control Rule R336.1629 of 72 percent and the federal emission control reduction in VOC of 19 percent associated with NESHAP application to natural gas transmission and storage were applied. The 19 percent emission reduction was obtained from the 5/14/99 EPA fact sheet that was published with the Final Air Toxics Rules for Oil and Natural Gas Production Facilities and Natural Gas Transmission and Storage Facilities. The federal NESHAP rule became effective June 17, 1999. Area source emissions were then reported using Source Classification Codes (SCC) of 2310010000 for crude petroleum oil production and 2310020000 for natural gas production.

4.3 Vessel Loading/Ballasting

Evaporative VOCs occur from Great Lakes ships when being loaded with gasoline and petrochemicals. Vapors are also displaced when cargo tanks are loaded with water for ballasting. In order to estimate VOCs from vessel loading/ballasting activities, a list of marine terminals at Michigan-based ports handling petroleum products was obtained from the Michigan Department of Transportation (MDOT). Because of the need to acquire information on gasoline and petrochemical handling at each Michigan port and the time frames during which vessel loading/ballasting occurred, a survey form was sent to the marine terminals that were previously surveyed in the 2002 inventory. This State survey approach went beyond the EPA's prescribed inventory procedures in Volume III, Chapter 12 of the Emission Inventory Improvement Program January 2001 guidance for Marine Vessel Loading, Ballasting and Transit. The survey form requested information on days of operation, seasonal fuel transfer information on gasoline, distillate fuel oil, jet naphtha, jet kerosene, kerosene, residual fuel oil, and crude petroleum loading into ship and barge cargo tanks as well as ballast operations. The survey data was then summed to derive

individual county totals. The results of this survey revealed that there were only two fuel types (contaminated gasoline, and residual fuel oil) where loading had occurred. VOC emission factors (0.00009 lbs/1000 gallons of residual fuel oil and 3.4 lbs/1000 gallons of gasoline) were then applied to their respective fuel volumes to obtain the estimated emission losses. Although on September 19, 1995, EPA issued the Federal Standards for Marine Tank Vessel Loading Operations and NESHAP for Marine Vessel Loading Operations, the respective facilities transferring fuel were exempt from control requirements. Consequently, emissions estimates were based on the respective emission factors without the application of control measures. Individual county VOC emission estimates from loading and ballasting operations were reported using the following SCC codes:

Table 4.3-1: Vessel Loading and Ballasting Operations SCC Codes

VESSEL LOADING/BALLASTING OPERATIONS	REPORTED SCC CODE
Vessel loading, distillate fuel oil	2505020090
Vessel loading, gasoline	2505020120
Vessel loading, residual fuel oil	2505020060
Vessel loading, crude oil	2505020030
Vessel loading, naphtha	2505020150
Vessel loading, jet kerosene	2505020180
Vessel loading, kerosene	2505020180
Vessel ballasting, gasoline	2505020900
Vessel ballasting, crude oil	2505020900

4.4 Service Station Loading (Stage I)

Gasoline vapor loss occurs at service stations when gasoline is unloaded from delivery tank trucks into underground storage tanks. The extent of vapor loss is dependent upon the method of filling (splash, submerge, or vapor balanced). In computing VOC emissions from service station loading, year 2005 gasoline throughput estimates were obtained from EIA's Petroleum Marketing Monthly data. The monthly data was then summed to derive an estimated statewide gasoline total. County gasoline total estimates were then determined by apportioning the statewide gasoline by the percent of state gasoline sales occurring within each county. County gasoline sales data was obtained from the U.S. Department of Commerce, Bureau of Census, Michigan 1997 Economic Census, Retail Trade, Geographic Area Series. State gasoline throughput consumption was apportioned on a county basis using the following mathematical equation:

Ct = St x Cs/Ss

Where:

Ct = Estimated county gasoline consumption for year 2005
St = Statewide gasoline consumption for year 2005
Cs = County gasoline service station retail sales data
Ss = State gasoline service station retail sales data

VOC emission estimates were developed based upon the guidance provided in the EPA prescribed inventory procedures in Volume III, Chapter 11 of the Emission Inventory Improvement Program January 2001 guidance for Gasoline Marketing (Stage I and Stage II) and subsequent September 2002 Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. Year 2005 and summer weekday emission factors were developed based upon actual temperature, and RVP fuel volatility information for various regions of the state to reflect the applicable RVP control measures.

Monthly temperature data was obtained for the year 2005 from the National Oceanic and Atmospheric Administration, National Climatic Center Local Climatological Data that was utilized in determining year and summer day temperatures for the Michigan Upper Peninsula and Michigan Lower Peninsula regions. RVP data for marketed gasoline during year 2005 was obtained from the Michigan Department of Agriculture, Motor Fuels Quality, Laboratory Division. VOC emission factors were developed for splash fill, submerge fill, and vapor balanced gasoline dispensing facilities on a county basis, which reflected the actual temperature and RVP of marketed gasoline products.

Year 2005 Temperature Summary

Month	Lower Peninsula Month Avg of Day Maximum	Upper Peninsula Month Avg of Day Maximum
December	33.5	24.8
January	28.0	18.9
February	33.8	29.5
March	38.2	33.2
April	59.7	53.8
May	64.8	59.3
June	82.4	77.1
July	83.5	79.4
August	81.8	77.1
September	77.3	72.5
October	62.1	55.7
November	49.4	37.1
Year Avg	57.9	51.5
Ozone Season Avg	74.9	69.9
Summer Weekday Avg	82.6	77.9

Stage I loading emission factors were determined using the methodology specified in the September 2002 Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. The following equation is presented:

$$L = 12.46 \times SPM/T$$

Where:

L = Loading loss (uncontrolled), pounds per 1000 gal of liquid loaded
S = A saturation factor where S= 0.6 for submerged loading:
with no vapor balance, S = 1.00 for submerge loading
with vapor balance, and S = 1.45 = splash loading no vapor balance
P = True vapor pressure of liquid loaded, pounds per square inch absolute (psia)
M = Molecular weight of vapors, pounds per pound-mole
T = Temperature of bulk liquid in degrees F + 460

The quantity of county gasoline throughput that is splash filled, submerge filled, and vapor balanced was estimated on basis of past gasoline surveys, and the applicability of state regulations that require the installation of submerge fill or vapor

balanced systems. These percentages were obtained from the year 1999 emissions inventory. The same county fractional percentages of splash filled, submerge filled, and vapor balanced were used in the year 2005 inventory for consistency with respect to prior emission inventory. **Table 4.4-2** shows all the calculations of Stage I emission factors for 2005. The respective emission estimates were reported using the following SCC codes shown in **Table 4.4-1**:

Table 4.4-1: Michigan Gasoline Marketing Stage I Emission SCC Codes

STAGE I TYPE	SCC
Submerge filled loading	2501060051
Splash filled loading	2501060052
Vapor balanced loading	2501060053

On December 19, 2003, the EPA issued final rule requirements for Stage I gasoline distribution in Standards of Performance for Bulk Gasoline Terminals and National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations. These NESHAP requirements will be applied in point source inventories for bulk terminals.

Table 4.4-2: Calculation of Stage I Emission Factors for Year 2005

Notes: Gasoline stage I temperatures based on available data as of 5/18/06. Reid vapor pressures were derived from the Michigan Department of Agriculture analytical data.

Region	Year 2005 Annual Emission Factor lbs/1000 gal	Ozone Season 4/1/05-9/30/05 Emission Factor lbs/1000 gal	Summer Weekday 6/1/05-8/31/05 Emission Factor lbs/1000 gal	Year 2005 Annual Temperature F	Year 2005 Ozone Season 4/1/05-9/30/05 Temperature F	Year 2005 Summer Weekday 6/1/05-8/31/05 Temperature F	Year 2005 Annual RVP	Ozone Season RVP 4/1/05-9/30/05	Summer Weekday RVP 6/1/05-8/31/05	Year 2005 Annual True Vapor Pressure P	Year 2005 Ozone Season 4/1/05-9/30/05 True Vapor Pressure P	Year 2005 Summer Weekday 6/1/05-8/31/05 True Vapor Pressure P	Saturation Factor S	Year 2005 Annual RVP Molecular Weight	Ozone Season 4/1/05-9/30/05 RVP Molecular Weight	Summer Weekday 6/1/02-8/31/02 RVP Molecular Weight
VAPOR BALANCE GASOLINE																
Upper Peninsula	0.76	0.91	0.99	**51.1**	**69.9**	**77.9**	11.2	9.6	9.0	4.82	5.82	6.4	1	64.4	66.2	66.67
Lower Peninsula	0.86	1.00	1.07	**57.9**	**74.9**	**82.6**	11.2	9.6	9.0	5.58	6.5	7	1	64.4	66.2	66.67
SE Michigan	0.86	0.96	0.99	**57.9**	**74.9**	**82.6**	11.2	9.3	8.4	5.58	6.23	6.4	1	64.4	66.47	67.07
SUBMERGE FILL GASOLINE																
Upper Peninsula	4.54	5.44	5.93	**51.1**	**69.9**	**77.9**	11.2	9.6	9.0	4.82	5.82	6.4	0.6	64.4	66.2	66.67
Lower Peninsula	5.19	6.01	6.43	**57.9**	**74.9**	**82.6**	11.2	9.6	9.0	5.58	6.5	7	0.6	64.4	66.2	66.67
SE Michigan	5.19	5.79	5.91	**57.9**	**74.9**	**82.6**	11.2	9.3	8.4	5.58	6.23	6.4	0.6	64.4	66.47	67.07
SPLASH FILL GASOLINE																
Upper Peninsula	10.97	13.14	14.33	**51.1**	**69.9**	**77.9**	11.2	9.6	9.0	4.82	5.82	6.4	1.45	64.4	66.2	66.67
Lower Peninsula	12.54	14.53	15.54	**57.9**	**74.9**	**82.6**	11.2	9.6	9.0	5.58	6.5	7	1.45	64.4	66.2	66.67
SE Michigan	12.54	13.99	14.29	**57.9**	**74.9**	**82.6**	11.2	9.3	8.4	5.58	6.23	6.4	1.45	64.4	66.47	67.07

4.5 Service Station Unloading/Vehicle Fueling (Stage II)

Motor vehicle fueling at service stations results in evaporative loss of gasoline. VOC emissions are produced during displacement of vaporized hydrocarbons and spillage of gasoline during refueling. EPA guidance in Volume III, Chapter 11 of the Emission Inventory Improvement Program, January 2001, Guidance for Gasoline Marketing (Stage I and Stage II) recommends the MOBILE model be used to generate refueling (Stage II) emission factors for highway emission inventories. Additional procedures were presented in September 2002 Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. The MOBILE6 model was used to derive the Stage II emission factor by obtaining monthly emission factors in grams/VOC mile as well as fuel economy as miles per gallon and vehicle miles traveled mix for the different gasoline vehicle types (e.g., light duty gasoline vehicle, light duty gasoline truck, and heavy duty gasoline vehicle). For each vehicle type, the monthly emission factor was multiplied by the fuel economy to obtain an emission factor in unit grams of VOC/gallon: grams VOC/gallon = Grams/mile x miles/gallon

Stage II grams/gallon refueling emission factor rates were initially prepared by SEMCOG using MOBILE6.2 and then later adjusted for year 2005 state specific RVP and temperature data. The vehicle miles traveled mix for each vehicle type was used to calculate a single weighted monthly emission factor. Summer and average annual emission factors were then developed for Southeast Michigan, the rest of the Lower Peninsula, and the Upper Peninsula. SEMCOG's Stage II grams/gallon adjusted emission factors are presented in **Table 4.5-1**. Stage II emission rates for year 2005 were greater than year 2002 rates due to the marketing of RVP exempt fuels during the Hurricane Katrina disruption of refinery operations.

Table 4.5-1: Year 2005 Refueling Emission Rates for State of Michigan

AVERAGE TYPE AND GEOGRAPHICAL AREA	GRAMS/GAL
SUMMER (AVERAGE OF MONTHLY REFUELING EMISSION RATES FOR JUNE, JULY & AUGUST, 2005)	
Southeast Michigan (Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne counties)	2.71
Rest of Lower Peninsula (All counties in Lower Peninsula except the 7 Southeast Michigan counties)	3.04
Upper Peninsula (All counties in the Upper Peninsula)	2.85
AVERAGE ANNUAL (AVERAGE OF MONTHLY REFUELING EMISSION RATES)	
Southeast Michigan (Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne counties)	2.94
Rest of Lower Peninsula (All counties in Lower Peninsula except the 7 Southeast Michigan counties)	3.05
Upper Peninsula (All counties in the Upper Peninsula)	2.94

All rates were initially calculated using MOBILE6.2 model, and then later adjusted for year 2005 RVP and temperature conditions. The respective SEMCOG grams VOC/gallon were converted to lbs/1000 gallons.

Lbs VOC/1000 gallons = Grams VOC/gallon x 1 lb/453 grams x 1000 gallons

Year 2005 gasoline throughput estimates were obtained from the EIA Petroleum Marketing Monthly data. The monthly data was summed to derive an estimated statewide gasoline total. County gasoline total estimates were then determined by apportioning the statewide gasoline by the percent of state gasoline sales occurring within each county. County gasoline sales data was obtained from the U.S. Department of Commerce, Bureau of Census, Michigan 1997 Economic Census, Retail Trade, Geographic Area Series. Total county emissions estimates were based on the county gasoline volume by the corresponding refueling emission factor. Emission rates were reported using the SCC code 2501060100.

4.6 Service Station Tank Breathing

Pressure changes occur within underground storage tanks as a result of temperature differences that exist between gasoline vapor and the liquid phases. The exchange of vapor within the storage tank to the atmosphere is commonly described as tank breathing.

Underground gasoline storage tank breathing losses were estimated by applying a 1.0 lb. per thousand gallon throughput emission factor using procedures presented in EPA's Volume III, Chapter 11 of the Emission Inventory Improvement Program, January 2001, Guidance for Gasoline Marketing (Stage I and Stage II) and September 2002, Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. Year 2005 county gasoline consumption estimates were obtained by apportionment of the statewide gasoline consumption based on the county percentage of state gasoline retail sales. Statewide gasoline consumption data was obtained from EIA Petroleum Marketing Monthly and county retail gasoline sales information was identified in the U.S. Department of Commerce, Bureau of Census, Michigan 1997 Economic Census, Retail Trade, Geographic Area Series. Emission estimates were reported using the SCC of 2501060200.

4.7 Gasoline Tank Truck Transit

Breathing losses from gasoline tank trucks occurs as a result of pressure changes within the containment vessel. The pressure change in the containment vessel is caused by temperature differences between the vapor and liquid phases and agitation during transport. Gasoline tank trucks leak VOC vapors and liquids from gaskets, seals, and seams during transport.

Because some gasoline is delivered to bulk plants rather than delivered directly to service stations from terminals, the amount of gasoline transferred in any area may exceed the total gasoline consumption, due to additional trips involved. Therefore, gasoline tank truck transit evaporation emissions were based on the total volume of gasoline transferred rather than county consumption level.

The total gasoline transferred in a given county was obtained by taking the sum of both the service station volume delivery and the bulk plant gasoline transfer. The bulk plant gasoline transfer volume in a county was obtained from point source data.

VOC emissions estimates were developed using the gasoline tank truck transit emission factors identified by EPA procedures presented in Volume III, Chapter 11 of the Emission Inventory Improvement Program January 2001 guidance for Gasoline Marketing (Stage I and Stage II). In this document, VOC loss from gas-filled tank truck emission factor was 0.005 lbs/1000 gallons, while empty vapor-filled tank trucks were 0.055 lbs/1000 gallons. A single emission factor of 0.06 lbs/1000 gallons was derived by taking the sum of the two respective factors, and then applying this emission factor to the total transported gasoline volume. Further emission adjustments were then made to the respective emission totals to reflect those delivery vessels in those counties that are subject to Michigan Air Pollution Control Rule 627 (R 336.1627). In counties subject to Stage I regulation under R 336.1627, application of 80 percent rule effectiveness and 100 percent rule penetration factors were applied in addition to the 76 percent control efficiency factor for delivery vehicle emissions. Emission estimates were reported using the SCC of 2505030120.

4.8 Aviation Fuel Stage I Loading

Gasoline vapor loss occurs at airports when gasoline is unloaded from delivery tank trucks into underground storage tanks. Because of the need to temporally adjust aircraft refueling emissions for all respective fuel types within all Michigan counties, it was determined that local aviation fuel sales information could only be acquired by contacting each fuel distributor serving each airport. Because the fleet of the aircraft varies at each airport, the amount of fuel type consumed will likewise be dependent on the types of aircraft being serviced and not just based upon Landing-Take Offs (LTOs) alone.

A list of those Michigan commercial and private airports where fuels are dispensed was obtained from the MDOT publication 2003 Michigan Airport Directory. A survey form was mailed to each airport operations manager. Total fuels sales information by fuel type(s) and season was obtained from either airport staff or assigned fixed base operators. This information was summed for each Michigan county to provide an estimate of the total volumes of jet kerosene, jet naphtha, and aviation gasoline handled at each airport facility. Stage I loading VOC emission factors for jet kerosene and jet naphtha were determined using the following equation:

$$L = 12.46 \times SPM/T$$

Where:

L = Loading loss (uncontrolled), pounds per 1000 gallons of liquid loaded
S = A saturation factor where 1.45 = splash loading
P = True vapor pressure of liquid loaded, pounds per square inch absolute (psia)
M = Molecular weight of vapors, pounds per pound-mole
T = Temperature of bulk liquid in degrees F + 460

For Stage I aviation gasoline VOC emissions, an emission factor was obtained from the EPA publication entitled: Documentation for the 2002 Nonpoint Source National Emission Inventory for Criteria and Hazardous Air Pollutants (January 2004 Version). The resultant emission factors were then applied to the total county fuel throughput

after considering point source fuel throughput deductions. Because the EPA does not provide itemized SCC codes by fuel type, VOC emissions were added together and reported using an SCC of 2501080050.

4.9 Aircraft Refueling (Stage II)

Aircraft refueling at airports results in the evaporative loss of aviation gasoline, jet kerosene, and jet naphtha. VOC emissions occur when vapor laden air in a partially empty fuel tank is displaced to the atmosphere during refueling. The quantity of the vapor being displaced is dependent upon the fuel temperature, fuel vapor pressure, aircraft fuel tank temperature, and the fuel dispensing rate.

Because of the need to temporally adjust aircraft refueling emissions for each respective fuel type within each Michigan county, the MDEQ decided that local aviation fuel sales information would best be acquired by contacting the fuel distributor serving each airport. Because the fleet of the aircraft varies at each airport, the amount of fuel type consumed will be dependent on the types of aircraft being serviced and not just based on LTO numbers alone.

A list of Michigan commercial and private airports where fuels are dispensed was obtained from the MDOT publication 2003 Michigan Airport Directory. A survey form was then mailed to each airport operations manager. Total fuels sales information by fuel type(s) and season were obtained from either airport staff or assigned fixed base operators. This information was summed for each Michigan county to provide the total dispensed volumes of jet kerosene, jet naphtha, and aviation gasoline. VOC aviation refueling loss emission factors, obtained from the EPA publication Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42), were applied to the respective county total fuel volumes as shown in **Table 4.9-1**.

Table 4.9-1: Total Fuel Volumes

AVIATION FUEL TYPE	EMISSION FACTOR AS LBS OF VOC/1000 GALLONS OF FUEL
Jet kerosene	0.08
Jet naphtha	5.58
Aviation gasoline	12.20

Because there is no current provision to allow for the reporting of emissions by individual fuel type, emissions were summed for all fuel types and reported using the SCC code 2275900000.

4.10 Traffic Marking Coatings

Traffic marking coatings are paints that are used to mark pavement, including dividing lines for traffic lanes, parking space markings, crosswalks, and arrows to direct traffic flow. VOC emissions result from the evaporation of organic solvents during the application and curing of the marking paint.

VOC emissions were estimated for each county using the methodology identified in the EPA's Volume III, Chapter 14 of the Emission Inventory Improvement Program, May 1997, Final Guidance for Traffic Markings. The preferred method was to conduct surveys to determine the volume of water and solvent based coating consumption, coating formulation (in terms of pounds of VOC content per applied gallon), and months of year 2005 when the coatings were applied. Survey forms were mailed to all Michigan county road commissions, major municipality road maintenance departments, and to MDOT. In those situations where a county road commission failed to submit such information, emission estimates were based upon results of those counties that had responded to the survey. An average coating application rate (total gallons of coating applied per road miles in county) was first determined from survey respondents. Road length miles were obtained for the counties that failed to respond to the survey. Total coating gallon consumption estimates were estimated for counties that failed to respond by applying the road length miles to the average coating application rate. Similarly, an average VOC content (as lbs/gallon) was obtained by dividing the total mass of VOC emissions by the total coating volume of survey respondents. The result was applied to the estimated coating volumes for those counties that did not respond to the survey. This average density was reflective of the proportions of solvent and water based coatings by survey respondents. Seasonal coating application was also based upon county survey results of the months during which the coatings were applied. Traffic marking paint emissions were reported using an SCC of 2401008000.

4.11 Cutback Asphalts

Cutback asphalt is a bituminous road coating material that is prepared by blending an asphalt cement tar with a petroleum distillate (such as naphtha, kerosene, or other fuel oils). Cutback asphalt is used as a pavement sealant, tack coat, pothole filler, and a bonding agent between layers of paving material. Evaporative loss of the solvent from bitumen cement occurs as the cutback asphalt cures on the road surface. The rate at which VOC emissions occur is dependent both upon the temperature of the applied road surface, and the type of solvent used in the formulation of the cutback asphalt material. Gasoline or naphtha is used as a diluent in the production of "rapid cure" cutback asphalts. Kerosene and other low volatility fuel oils are also used as diluents in the production of "medium cure" and "slow cure" cutback asphalts.

VOC emissions were estimated for each county using the methodology identified in the EPA's Volume III, Chapter 17 of the Emission Inventory Improvement Program, January 2001 Final Guidance for Asphalt Paving. In this document, the preferred method was to conduct surveys to determine locally-specific information on cutback asphalt use on Michigan roads.

In order to estimate VOC emissions from the application of cutback asphalt materials (rapid cure, medium cure, and slow cure), a survey was mailed to all Michigan county road commissions, major municipality road maintenance departments, and to MDOT. The survey requested information on:

1. The quantities of rapid cure, medium cure, and slow cure cutback asphalt materials that were applied during year 2005;
2. The type of petroleum distillate and volume that was used as a diluent in the formulation of each cutback paving material; and
3. The months during which cutback asphalt materials were applied.

Evaporation emissions for rapid cure materials were calculated with the assumption that 75 percent by weight of diluent evaporates in the first day. For medium cure cutback asphalt materials, the assumed evaporative rate was 50 percent by weight of diluent in one week. All evaporative activity was assumed to occur during the season applied. There is a four month season in Michigan.

VOC emission estimates were based on the amount of the petroleum-based diluent that comprises the cutback asphalt material and then applying their respective solvent density. Emission estimates were reported using an SCC of 2461021000.

4.12 Emulsified Asphalts

Emulsified asphalts are a type of liquefied road surfacing material that is used in the same application as cutback asphalts. Instead of blending the asphalt material with a petroleum distillate like their cutback asphalt counterparts, emulsified asphalts use a blend of water with an emulsifier (soap). Emulsified asphalts either rely on water evaporation to cure (anionic-high float emulsions) or ionic bonding of the emulsion and the aggregate surface (cationic emulsions).

A survey of emulsified asphalt application on roadways is EPA's preferred method of estimating emissions, Volume III, Chapter 17 of the Emission Inventory Improvement Program, January 2001, EPA Final Guidance for Asphalt Paving. Survey forms were mailed to all Michigan county road commissions, major municipality road maintenance departments, and to MDOT. Information on the quantities of asphalt materials (in pounds and barrels) applied to Michigan roadways, the months in which they were applied, and road length miles was requested. An average application rate (total barrels of emulsified asphalts applied per road miles in county) was determined from completed and returned surveys. For non-responsive counties, emission estimates were made based on averages of those counties that had responded to the survey. VOC emissions were obtained by applying the EPA factor of 9.2 lbs VOC/barrel of applied asphalt with the assumption that all emissions occur during the season that the asphalt materials were applied and reported using an SCC of 2461022000.

4.13 Breweries

Breweries, microbreweries, brewpubs, and contract brewers emit VOC including ethanol, ethyl acetate, myrcene and other higher alcohols from various brewing processes. For the smaller brewers, VOC are lost by the fermentation, in brew kettles, hot wort, mash and lauter tuns, and through spent grain. Microbreweries and brewpubs typically produce beer for patron on-site consumption, although some may have limited keg distribution. These smaller microbreweries and brewpubs typically

combine some processes, and canning/bottling operations typically do not exist since the beer is consumed on-site or stored in kegs.

Various trade organization lists were obtained to identify brewers in the state of Michigan along with their beer production. Although there are some regional breweries, the vast majority are brewpubs and microbreweries. These facilities have very small to insignificant VOC emissions. Emission estimates were based on a combined emission factor rate obtained from Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42) of 3.0465 lbs VOC per 1000 barrels. Consequently, this small emission factor and Michigan beer production rates didn't justify the need for a survey of such establishments. Emissions were estimated by establishment on the basis of trade reported production and applying the respective emission factor. An SCC of 2302070001 was used in reporting brewery emissions.

4.14 Distilleries

Distilleries include ethanol production facilities that are used in the production of gasohol motor fuels, grain alcohol for industrial purposes, and distilled spirits for personal consumption. These products are produced from the fermentation of aged mashed grains with distillation for the capture of desired alcohol based products. The fermentation products use yeast to convert grain sugars into ethanol, ethyl acetate, isomyl alcohol, isobutyl alcohol and carbon dioxide. Grains used in the process may include corn, rye, barley, and wheat. A more detailed description of distilleries and their emissions can be found in the EPA publication entitled: Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42).

During year 2005, there was only one ethanol production facility in operation, the Michigan Ethanol LLC, in Caro, Michigan. This facility was being reported as a point source. Consequently, the area source contribution from distilleries using SCC 2302070010 had zero emissions for all Michigan counties. A number of new ethanol plants were under construction, but did not operate in the 2005 inventory year.

4.15 Wineries

Wineries produce alcohol beverages from the fermentation of fruit juices. The major processes in vinification include fruit harvesting, crushing, pressing, fermentation, clarification, aging, finishing, and bottling. During this fermentation process of both red and white wines, primarily ethanol and smaller quantities of methyl alcohol, n-propyl alcohol, butyl alcohol, isoamyl alcohol, and acetaldehydes are produced along with carbon dioxide. This process involves the reaction of a yeast with glucose and fructose sugars to produce ethanol and carbon dioxide. The EPA emission factors are reflective of VOC evolved during fermentation in vinification.

County estimates of wine production were based upon wine volume information of Michigan Department of Treasury tax receipt information supplied to the Michigan Grape and Wine Industry Council. A VOC emission factor was obtained from

Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42).of 4.6263 lbs VOC/ 1000 gallons. This emission factor is a sum of ethyl alcohol, methyl alcohol, n-propyl alcohol, n-butyl alcohol, sec-butyl alcohol, isobutyl alcohol, isoamyl alcohol and acetaldehyde for red wine from AP-42. Emission estimates were reported using an SCC of 230207005.

4.16 Stationary Source Fossil Fuel Combustion

The combustion of natural gas, propane-LPG, distillate fuel oil, kerosene, and residual fuel oil in small boilers, furnaces, heaters, and stoves are also a source of VOC, NOx, particulates, SO_2, and NH_3 emissions. Because these sources are so numerous to be identified in point source inventories, this area source category attempts to provide a collective estimate of emissions from these smaller energy consumption sources by subtracting all fuel used by point sources from total fuel consumption. Procedures for the estimation of these smaller sources are presented in the EPA's documents entitled:

1. Volume II, Chapter 2 of the Emission Inventory Improvement Program January 2001 Preferred and Alternate Methods for Estimating Air Emissions from Boilers.
2. Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract- Fuel Oil and Kerosene Combustion
3. Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Natural Gas and LPG Combustion
4. Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Coal Combustion
5. Documentation for the Draft 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia
6. Hanke, B.H, manuscript prepared for EPA entitled: A National Methodology and Emission Inventory for Residential Fuel Combustion

This estimation involves determination of total fuel consumption over an area with subsequent fuel deductions made for point source fuel consumption, with the application of emissions factors to estimate fuel emissions.

Total fuel consumption information was based on data supplied from U.S. Department of Energy (DOE), EIA documents. This unaccounted fuel consumption was apportioned to individual counties using U.S. Census Bureau information for the individual end use sector fuel types based on LADCO states' methodology. Area source fuel emissions were reported for the following residential, commercial/institutional, and industrial end use sectors. Utility boilers are counted as point sources, so area source emissions are not reported for this end use sector.

4.17 Residential Boilers & Furnaces

County emission estimates for the residential end use sector was based on the consumption of natural gas, propane-LPG, distillate fuel oil, kerosene, and coal. This

energy consumption information was obtained from DOE, EIA data. Since the EIA merely provides statewide fuel consumption totals, county fuel consumption estimates were obtained by apportioning the fuel consumption based upon the number of year 2000 occupied household census counts using the given fuel. Emission estimates were calculated using the following mathematical equation:

Cf = Ch/Sh x Sf

Where

Cf = Estimated county residential sector consumption of a given fuel type for year 2005
Ch = Number of year 2000 census occupied households in a given county that utilize a given fuel type
Sh = Total number of year 2000 census occupied households statewide that utilize a given fuel type
Sf = Total statewide residential sector consumption of a given fuel type

Table 4.17-1: Michigan Residential Fuel Consumption Information Sources

RESIDENTIAL FUEL TYPE	U.S. DEPT OF ENERGY, EIA DATA SOURCES
Natural gas	Natural Gas Annual 2005, Michigan Table 48
Propane LPG	Petroleum Marketing Annual, 2005, Table 49: Prime Supplier Sales Volumes of Aviation Fuels, Propane and Residual Fuel Oil by Petroleum Administration for Defense Districts and State
Distillate fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 19: Adjusted Sales for Residential Use: Distillate Fuel Oil and Kerosene, 2005
Kerosene	Fuel Oil and Kerosene Sales 2005 Report, Table 18: Adjusted Sales of Kerosene by Energy Use
Coal	EIA Annual Coal Report 2005, Table 26 U.S. Coal Consumption by End Use Sector, by Census Division and State 2005, 2004 (Thousand Short Tons)

These county residential fuel consumption estimates for the various fuel types in all Michigan counties were used to calculate Cf emission estimates by applying an emission factor specific to that fuel type. The emission factors shown in **Table 4.17-2** were obtained from various EPA publications.

Table 4.17-2: Michigan Residential Fuel Emission Factors

RESIDENTIAL FUEL TYPE	UNITS	CO	NH_3	NOx	PM_{10}-PRI	PM_{25}-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	40	0.49	94	7.6	7.6	0.6	5.5
Propane LPG	Lbs/1000 gal	3.2		13	0.68	0.68	0.1	0.5
Distillate fuel oil	Lbs/1000 gal	5.0	0.8	18	2.38	2.13	42.60	0.7
Kerosene	Lbs/1000 gal	4.8	0.8	17.4	2.38	2.13	41.1	0.7
Coal	Lbs/ton	275	0.000565	3.0	18.63	4.86	37.83	10

Sources of Emission Factors:

1. EPA Documentation for the Draft 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia

2. Hanke, B.H, manuscript prepared for EPA entitled: A National Methodology and Emission Inventory for Residential Fuel Combustion
3. EPA. Final Report on Development and Selection of Ammonia Emission Factors

The resulting emission estimates were reported by individual fuel type using the SCC codes shown in **Table 4.17-3**.

Table 4.17-3: Michigan Residential Combustion Emission SCC Codes

RESIDENTIAL FUEL TYPE	SCC
Natural gas	2104006000
Propane LPG	2199007000
Distillate fuel oil	2104004000
Kerosene	2104011000
Coal	2104001000

4.18 Commercial/Institutional Boilers and Furnaces

Estimation of fuel combustion by the commercial/institutional sector was performed using an adaptation of a methodology presented in the EPA publications:

1. Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract- Fuel Oil and Kerosene Combustion
2. Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Natural Gas and LPG Combustion
3. Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Coal Combustion

County emission estimates for the commercial/institutional end use sector were based upon the consumption of natural gas, residual fuel oil, distillate fuel oil, kerosene, and coal. This energy consumption information was obtained from the DOE, EIA data (see **Table 4.18-1**). Fuels were subtracted for point sources, and the net area fuel contribution was apportioned or allocated using procedures instructed by LADCO. This procedure involved statewide commercial/institutional fuel apportionment to a county level using the commercial/institutional employment data as obtained from U.S. Department of Commerce, Bureau of Census publication entitled: County Business Patterns, Michigan: 2003 (CBP/03-24 issued September, 2005). County fuel estimates of individual fuel types were estimated using the following equation:

Cf = Ce/Se x Sf
Cf = Estimated county commercial/institutional sector consumption of a given fuel type
Ce= Total county employment in the commercial/institutional sector
Se= Statewide employment in commercial/institutional sector
Sf= Statewide commercial/institutional sector consumption of a given fuel type

Because the EIA data includes diesel fuel totals within the distillate fuel oil total, these motor vehicle fuels were deducted to provide only an estimate of #1, #2, and #4 fuel oils.

Table 4.18-1: Michigan Commercial/Institutional Fuel Consumption Information Sources

FUEL TYPE	DOE, EIA DATA SOURCES
Natural gas	Natural Gas Annual 2005, Michigan Table 48
Residual fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 17: Adjusted Sales of Residual Oil by Energy Use, 2004 and 2005
Distillate fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 20: Adjusted Sales for Commercial Use: Distillate Fuel Oil, Residual Fuel Oil and Kerosene 2005
Kerosene	Fuel Oil and Kerosene Sales 2005 Report, Table 18: Adjusted Sales of Kerosene by Energy Use
Coal	EIA Annual Coal Report 2005, Table 26 U.S. Coal Consumption by End Use Sector, by Census Division and State 2005, 2004 (Thousand Short Tons)

County commercial/institutional fuel consumption estimates for the various fuel types in all Michigan counties were used to estimate the emissions in **Table 4.18-2**, by applying an emission factor specific to that fuel type. These emission factors were obtained from various EPA publications.

Table 4.18-2: Michigan Commercial/Institutional Fuel Emission Factors

COMMERCIAL/ INSTITUTIONAL FUEL TYPE	UNITS	CO	NH_3	NOx	PM_{10}-PRI	PM_{25}-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	84	0.49	100	7.6	7.6	0.6	5.5
Residual fuel oil	Lbs/1000 gal	5	0.80	55	9.07	3.37	194.05	1.13
Distillate fuel oil	Lbs/1000 gal	5	0.80	20	2.38	2.13	53.96	0.34
Kerosene	Lbs/1000 gal	5	0.80	18	2.38	2.13	41.1	0.713
Coal	Lbs/ton	6	0.000565	7.5	6.0	2.2	36.86	0.05

Sources of Emission Factors:

1. LADCO state uniform adopted emission factors for commercial/institutional natural gas combustion
2. EPA. Factor Information Retrieval System (FIRE) database
3. EPA. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42)
4. EPA. Final Report on Development and Selection of Ammonia Emission Factors

The resulting emission estimates were reported by individual fuel type using the SCC codes shown in Table **4.18-3**.

Table 4.18-3: Michigan Commercial/Institutional Combustion Emission SCC Codes

Fuel Type	SCC
Natural gas	2103006000
Residual fuel oil	2103005000
Distillate fuel oil	2103004000
Kerosene	2103011005
Coal	2103002000

4.19 Industrial Boilers and Furnaces

Estimation of fuel combustion emissions of industrial boilers and furnaces was performed in similar manner as the commercial/institutional sector. Statewide industrial fuel consumption information was obtained from the DOE, EIA publications. Point source deductions were made for each fuel type to obtain the area contribution, which was then apportioned to the county level using LADCO prescribed procedures.

The county fuel consumption estimates of natural gas, residual fuel oil, distillate fuel oil, kerosene, and coal, in **Table 4.19-1**, were based upon the following mathematical equation:

Cf = Ce/Se x Sf
Cf = Estimated county industrial sector consumption of a given fuel type
Ce = Total county employment in the industrial sector
Se = Statewide employment in industrial sector
Sf = Statewide industrial sector consumption of a given fuel type

Table 4.19-1: Michigan Industrial Fuel Consumption Information Sources

Industrial Fuel Type	DOE, EIA Data Sources
Natural gas	Natural Gas Annual 2005, Michigan Table 48
Residual fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 17: Adjusted Sales of Residual Oil by Energy Use, 2004 and 2005
Distillate fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 21 Adjusted Sales for Industrial Use: Distillate Fuel Oil, Residual Fuel Oil, and Kerosene (#1, #2, and #4 fuel oils– excludes diesel oil)
Kerosene	Fuel Oil and Kerosene Sales 2005 Report, , Table 18: Adjusted Sales of Kerosene by Energy Use
Coal	EIA Annual Coal Report 2005, Table 26 U.S. Coal Consumption by End Use Sector, by Census Division and State 2005, 2004 (Thousand Short Tons)

County employment data was obtained from the U.S. Department of Commerce, Bureau of Census publication entitled: County Business Patterns, Michigan: 2003 (CBP/03-24 issued September, 2005). Upon obtaining county industrial fuel consumption estimates for the various fuel types in all Michigan counties, emission estimates were obtained by applying an emission factor that is specific to that fuel type. The emission factors in **Table 4.19-2** were generally based on the LADCO adopted emissions factors.

Table 4.19-2: Michigan Industrial Fuel Emission Factors

INDUSTRIAL FUEL TYPE	UNITS	CO	NH_3	NOx	PM_{10} -PRI	PM_{25} -PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	84	3.2	100	7.6	7.6	0.6	5.5
Residual fuel oil	Lbs/1000 gal	5.0	0.8	55	7.17	4.67	157	0.28
Distillate fuel oil	Lbs/1000 gal	5.0	0.8	20	2.3	1.55	53.96	0.2
Kerosene	Lbs/1000 gal	5.0	0.8	18	2.38	2.13	41.1	0.713
Coal	Lbs/ton	6	0.00057	7.5	6.0	2.2	38	0.05

Sources of Emission Factors:

1. LADCO state uniform adopted emission factors for industrial natural gas, residual fuel oil, distillate fuel oil, and coal combustion
2. EPA. FIRE database
3. EPA. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42)
4. EPA. Final Report on Development and Selection of Ammonia Emission Factors

Emission estimates were reported using the SCC codes shown in **Table 4.19-3**:

Table 4.19-3: Michigan Industrial Combustion Emission SCC Codes

INDUSTRIAL FUEL TYPE	SCC
Natural gas	2102006000
Residual fuel oil	2102005000
Distillate fuel oil	2102004000
Kerosene	2102011000
Coal	2102002000

4.20 Remedial Action, Site Cleanup and Leaking Storage Tanks

Evaporative VOC emissions occur during remediation and cleanup at sites of environmental contamination. Remediation activities may include air stripping or sparging of a VOC from contaminated groundwater or incineration of a spoil material removed from a contaminated site. In some instances carbon adsorption may be required to reduce VOC emitted during air stripping or spraying operations.

Estimation of VOC loss from remedial action activities was determined by summing the allowable emissions from MDEQ air permits. Although site remediation activities are subject to NESHAP regulations, these requirements did not apply at the time of the year 2005 emissions inventory. Emissions were reported using an SCC of 2660000000.

4.21 Municipal Waste Landfills

A municipal solid waste landfill is defined as any facility that is regulated under Subtitle D of the Resource Conservation and Recovery Act that receives primarily household and/or commercial wastes.

VOCs are produced from municipal solid waste by: the volatilization of the waste material itself, the microbiological (anaerobic) putrefaction of organic waste materials that result in the formation of organic acids and alcohols that are vaporized, and the chemical reaction of one or more waste materials or chemical decomposition intermediate. The rate at which VOCs are emitted from a landfill is dependent upon the structural design of cells, waste composition (physical/chemical properties), moisture content of the waste, the amount of waste disposed, temperature, age of the landfill, chemical reactivity of the waste, microbiological toxicity of the waste, and the effectiveness of landfill gas collection systems. Incomplete combustion occurs when landfill gas is flared, and when gas is used to fuel boilers and internal combustion engines. This incomplete combustion produces additional air pollutants, i.e., particulates ($PM_{2.5}$ and PM_{10}) and carbon monoxide.

Estimation of VOC emissions from municipal landfills were based on the revised technical procedures presented in the EPA publication entitled: Volume III, Chapter 15 of the Emission Inventory Improvement Program January 2001 Revised Final Guidance for Landfills. In this publication, the preferred method for the estimation of area source emissions is to use the LandGem model or the equations from the Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42) section on landfills. LandGem is a computer-based model that uses the same equations as that of AP-42. The emissions calculation for the estimation of landfill gas requires site specific information including: landfill design capacity, accumulated waste totals from operation of the landfill, and existing control requirements from landfill gas collection systems. Landfills may be subject to either new source performance standards (40 CFR, part 60 Subpart WWW) or emission guidelines (40 CFR, part 60, Subpart Cc). Landfills are now also subject to NESHAPs, which became effective on January 16, 2003. For those landfills that were not being reported in the point source inventory, area emission estimates were reported on the basis on LandGem model simulations using the SCC of 2620030000. These simulations reflected total waste receipts under the prior year 1999 inventory, with addition made for waste receipts for years 2000-2005, as obtained from annual reports by the MDEQ, Waste and Hazardous Division Report of Solid Waste Landfilled in Michigan. Emission calculation for landfills gas collection/combustion systems utilized control efficiencies listed in the following **Tables 4.21-1** and **4.21-2**, consistent with AP-42 factors. The LandGem model, utilizing 75 percent control efficiency, was used to adjust predicted methane generation at a site.

Table 4.21-1: Non-Methane Organic Compound Control Efficiencies for Landfill Gas Combustion from AP-42

COMBUSTION CONTROL DEVICE	TYPICAL CONTROL EFFICIENCY (%)
Boilers	98
Flares	99.2
Gas Turbines	94.4
IC Engine	97.2

Table 4.21-2: Emission Rates for Secondary Compounds from Landfill Gas Combustion
(Based upon lbs/ Million Cubic Feet of Landfill Gas Combusted)

COMBUSTION CONTROL DEVICE	NOx	$PM_{2.5}$-PRI	PM_{10}-PRI	CO
Flare	40	17	17	750
IC Engine	250	48	48	470
Boiler	33	8.2	8.2	5.7
Gas Turbines	87	22	22	230

4.22 Architectural Surface Coating, 2005

Alternative method one was chosen from the guidance document Emission Inventory Improvement Program (EIIP), Volume III, Area Sources Preferred and Alternative Methods, Chapter 3: Architectural Surface Coating. Data was readily available for the use of per capita emission factors.

Per capita usage factors were derived by dividing the 2004 quantity of coating material (solvent-based and water-based paint) on a national level by total U.S. population. The quantity data was obtained from the U.S. Census Bureau MA325F, Paint and Allied Products.[11]

Solvent-Based Paint

Solvent-based paints produced and shipped in the U.S. in 2004, the most recent available year, were totaled (includes architectural lacquers and architectural coatings, not specified by kind). The resulting number was divided by the 2005 U.S. population to produce a per capita solvent-based paint usage factor of 0.5265 gallons per person.

The resulting solvent paint use, in gallons per county, was multiplied by a VOC emission factor of 3.87 lb/gallon, from Table 5-2 of the EIIP guidance, Volume III, Area Sources Preferred and Alternative Methods, Chapter 3: Architectural Surface Coating. This produced total VOC emissions from solvent-based paint.

Water-Based Paint

Water-based paints produced and shipped in the U.S. in 2004 were totaled. The resulting number was divided by the 2005 U.S. population to produce a per capita water-based paint usage factor of 2.2473 gallons per person.

The resulting water-based paint use in gallons per county was multiplied by a VOC emission factor of 0.74 lb/gallon, from Table 5-2 from the EIIP guidance, Volume III, Area Sources Preferred and Alternative Methods, Chapter 3: Architectural Surface Coating. This produced total VOC emissions from water-based paint. The VOC was speciated for toxics, utilizing speciation factors from Table 5-3 from the EIIP guidance.

[11] The following websites were utilized for this information: U.S. Census Bureau, http://www.census.gov; http://www.census.gov/industry/1/ma325f04.pdf; and http://www.census.gov/popest/national/files/NST_EST2005_ALLDATA.csv.

No point source deductions were performed, as none were needed for this category.

4.23 Autobody Refinishing in Michigan, 2005

Alternate method 3 of the EIIP document, Volume III, Area Sources Preferred and Alternative Methods, Chapter 13: Auto Body Refinishing was followed by the MDEQ. National emissions for the category were allocated to the county level based on census data.

Based on 1997, 1998, and 1999 data, 79,429.59 tons of VOC were estimated nationally for this category, as indicated within the Great Lakes Commission (GLC) methodology. The estimate of national VOC emissions from autobody refinishing was divided by a 2005 national population estimate of 296,410,404 to produce a VOC emission factor of 0.54 lbs/person. Area source estimations were adjusted by deducting point source VOC emissions.

A seasonal adjustment factor of 1.0 was made for this category for the ozone season. The category of auto refinishing was considered to be uniform throughout the year, per Table 5.8.1 of the EPA document Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. Ozone season daily emissions were calculated per the example on page 5-23 of the EPA document. Ozone season throughput was also calculated. Five activity days per week were selected, per Table 5.8.1 (EPA document). Annually, 260 days of operation were assumed. NOx and CO emissions were not calculated, as this category is not considered a source of NOx or CO.

References

1. Emission Inventory Improvement Program, Volume 3, Chapter 13, Auto Body Refinishing, January 2000.
2. EPA FIRE 6.23 database
3. U.S. Census Bureau, Population Division. 2006. Population Estimates Program. Washington, DC 20233.
4. Annual County Business Patterns data are available through U.S. census at http://www.census.gov/epcd/cbp/view/cbpview.html
5. Section 3.8 of Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I (1991)

4.24 Estimating Emissions from Consumer and Commercial Solvent Use

The GLC methodology, a portion of which is included below, was based on the EIIP guidance document, Volume III, Area Sources Preferred and Alternative Methods, Chapter 5: Consumer and Commercial Solvent Use. The MDEQ used the EIIP and GLC guidance for the estimation of criteria and toxic pollutants for this category for 2005. The MDEQ chose to use the preferred method with per capita emission factors, adjusted for the federal VOC reduction rule as provided in Table 2 of the EIIP guidance. **Table 4.24** shows the SCCs utilized by the MDEQ as recommended by LADCO:

Table 4.24: Consumer and Commercial Solvent Use SCC Codes

CONSUMER USES	SCC
personal care products	2460100000
household Products	2460200000
automotive aftermarket	2460400000
adhesives and sealants	2460600000
FIFRA-regulated products	2460800000
coatings and related products	2460500000
miscellaneous products	2460900000

From GLC methodology: All quotes and information contained within are from the, Emission Inventory Improvement Program, Volume 3, Chapter 5, Consumer and Commercial Solvent Use, August 1996. The consumer and commercial solvent source category includes a wide array of products including personal care products, household cleaning products, and household pesticides. However, all VOC emitting products used by businesses, institutions, and numerous industrial manufacturing operations are also included. A detailed list of products included in this category can be found on page 5.2-3 of the 1996 EIIP document. The majority of VOCs introduced into the atmosphere from this category is a result of evaporation of the solvent contained in the product or from the propellant released during product use.

4.25 Dry Cleaning Area Source Emissions for Michigan, 2005

Standard Industrial Classification (SIC) 7215 (coin-operated dry cleaning establishments) was not considered for this inventory. The MDEQ Air Quality Division's (AQD's) dry cleaning staff in the Technical Programs Unit indicated that virtually all coin-operated dry cleaning machines in Michigan have been discontinued due to the large cost of keeping them supplied with perchloroethylene (per Elden Dickinson, AQD). SIC 7216 (dry cleaning establishments, excluding coin-operated facilities) was considered instead. Under the North American Industrial Classification System (NAICS), SIC 7216 is known as NAICS 812320.

To calculate 2002 VOC emissions, the MDEQ utilized alternative method two, per employee emission factor. County employment data for 2003 was obtained from the U.S. Census Bureau's document, 2003 Michigan County Business Patterns. Data for 2005 was not available, and was not expected for some time.

Dry cleaning has a uniform seasonal adjustment factor (1.0), remaining constant during the ozone season, per EPA's Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources.

Employment data for 2005, the latest from the U.S. Census Bureau's County Business Patterns, was obtained for NAICS 812320 for each county where it was available. Where available, employment data for the broader category of NAICS 812 was also obtained.

A ratio between the number of employees under NAICS 812320, and the number of employees under NAICS 812 was determined. For counties that had employment

numbers for NAICS 812, this ratio was used to estimate how many of the employees would fall under the code 812320.

Next an employment number for those counties where drycleaner employment numbers were not available from the County Business Patterns was developed. Using population numbers for those counties where employment data was available, a per capita number of dry cleaning employees was calculated. As certain counties have no perchloroethylene drycleaners (per lists of perc dry cleaners from Mr. Randy Johnson, MDEQ, AQD), values of zero were entered for those counties.

Reports from Michigan's 2005 point source emission inventory (the latest complete inventory) were reviewed to determine if any counties had point source employment for SIC 7216 (NAICS 812320). Berrien, Ingham, and Jackson (NAICS 8123) counties did have point sources under SIC 7216, and the number of employees at each source was obtained from the emission inventory. Each source's employment number was subtracted from the appropriate county's employment number.

Once estimates of employment for SIC 7216 were available for each county, an emission factor for VOC of 1,800 lb/yr/employee was obtained from Table 4.5-1 of EIIP Vol. III, Chapter 4. The following **Table 4.25-1** provides the VOC emission factor:

Table 4.25-1: Emission Factor for VOC

SUBCATEGORY	REACTIVE VOC (LB/YEAR/EMPLOYEE)	TOTAL ORGANICS (LB/YEAR/EMPLOYEE)
All solvents (total)	1,800	2,300
Halogenated Solvents PERC, TCA and CFC 113 Coin Operated Commercial/Industrial		 980 52 1,200
Mineral Spirits and Other Unspecified Solvents	1,800	1,800

On a per unit basis: 0.8 tons/facility-year (assumes that average coin-op facility has two dry cleaning units and each emits 0.4 tons of PERC per year). From AP-42:

Commercial: 1.3 lb/year/person (all nonmethane VOC)
Coin Operated: 0.4 lb/year/person (all nonmethane VOC)

A rule for perchloroethylene dry cleaning air emissions became effective late 1996 (58FR49354. NESHAP for Source Categories: Perchloro-ethylene Dry Cleaning Facilities. Final Rule. September 22, 1993.). The EPA estimates the rule reduces perchloroethylene emissions from dry cleaning operations by 44 percent. Depending on the methodology used to estimate air emissions from perchloroethylene dry cleaning operations the effectiveness of this rule may need to be factored into the calculation.

References:

1. U.S. Census Bureau, 2003 Michigan County Business Patterns

2. Emission Inventory Improvement Program Vol. III, Area Sources: Preferred and Alternative Methods, Chapter 4, Dry cleaning. May 1996.
3. Elden Dickinson, Dry Cleaning Unit, Drinking Water and Radiological Protection Division, MDEQ. Personal communication, May 7, 2001.
4. EPA. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. May 1991. EPA – 450/4-91-016.

4.26 Graphic Arts Criteria and Toxics, 2005

The EIIP area source guidance document, dated November 18, 1996, was followed. The EIIP preferred method was not utilized, as it required a survey of facilities. Alternative Method 1, ink sales emission factor method was found to be not feasible for Michigan, as (during calculation of the 1999 inventory) point sources used more ink than the state proportion of national ink production was calculated to be.

Per Alternative Method 2, the population of the inventory region was obtained from state data for 2005, and multiplied by the per capita emission factor provided in the EIIP guidance. This produced total uncontrolled emissions from all graphic arts facilities with less than 100 tons per year of VOC emissions, for the entire state. This method used a 1991 EPA emission factor of 0.00065 tons VOC per capita.

Total uncontrolled VOC emissions from area source graphic arts facilities (those with less than 100 tons per year of VOC emissions) was then estimated for each county. This was done by obtaining uncontrolled VOC emissions from point sources with less than 100 tons per year of VOC, from the 2005 EI. SIC codes 2711, 2721, 2752 and 2754 (NAICS 51111, 511112, 323114, and 323111) were queried. This number was subtracted from total uncontrolled emissions from graphic arts facilities, on a county by county basis. The remaining number is the area source VOC emissions per year.

4.27 Solvent Cleaning 2005 (criteria)

In this category, the use of solvents is broken into two broad classifications. The classifications are the EIIP Alternative Method for solvent cleaning (which is composed of cold cleaning and vapor/in-line cleaning), and the Recommended Method for solvent cleanup (predominantly wipe cleaning of external surfaces).

EIIP Alternative Method for Solvent Cleaning Equipment (both Cold Cleaners and Vapor/In-line Cleaners)

Emission factors: EIIP Table 6.5-2 provides per capita and per employee emission factors. **Table 4.27-1** is a replica of the EIIP table.

Table 4.27-1: Per Capita and Per Employee Solvent Cleaning Emission Factors (EPA, 1991)

SUBCATEGORY	SIC CODES	PER CAPITA FACTOR (LB/YR/PERSON)		PER EMPLOYEE FACTOR (LB/YR/PERSON)	
		VOCs	Organics	VOCs	Organics
Solvent cleaning (total)	25, 33-39, 417, 423, 551, 552, 554-556, 753	4.3	7.2	87	144
COLD CLEANING					
Automobile Repair	417, 423, 551, 552, 554-556, 753	2.5	2.5	270	270
Manufacturing	25, 33-39	1.1	1.1	24	24
VAPOR AND IN-LINE CLEANING					
Electronics and Electrical	36	0.21	1.1	29	150
Other	25, 33-39, 417, 423, 551, 552, 554-556, 753	0.49	25	9.8	49

Recommended Method for Solvent Cleaning Equipment

Michigan chose to use the per employment factors available from the Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone: Volume I: General Guidance for Stationary Sources (EPA, 1991), for the 2005 emissions inventory (shown in the following **Table 4.27-1**). Employee data was obtained from the U.S. Bureau of the Census document, County Business Patterns, Michigan: 2003, which was the most recent version at the time the category was estimated. Area source emissions were then determined by subtracting point source emissions from total emissions. When the result was a negative number, area source emissions were set to zero.

The following SCCs, per email from Grant Hetherington, Wisconsin Department of Natural Resources on September 19, 2005, were utilized for reporting the emissions to be consistent with the other LADCO states:

2415360000 - Auto Repair Services (SIC 75): Cold Cleaning
2415345000 - Miscellaneous Manufacturing (SIC 39): Cold Cleaning
2415245000 - Miscellaneous Manufacturing (SIC 39): Conveyerized Degreasing
241523000 - Electronic and Other Elec. (SIC 36): Conveyerized Degreasing

2005 point source employment data was obtained from MAERS. These values were then deducted from the total emissions estimated by using the per capita emission factor and 2005 Michigan county population data.

References:

1. EPA. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone: Volume I: General Guidance for Stationary Sources (May 1991).
2. EPA. STAPPA-ALAPCO-EPA Emission Inventory Improvement Program (EIIP). Volume III - Area Sources Preferred and Alternative Methods. Chapter 6, Solvent Cleaning. September 1997.
3. US Department of Commerce, Bureau of the Census. County Business Patterns, Michigan: 2003. September 2005.

4.28 Industrial Surface Coatings, Toxics, 2005

The GLC methodology was followed by the MDEQ for estimating toxics for 2005. The GLC methodology is based on EIIP, Volume III, Area Sources Preferred and Alternative Methods, Chapter 8: Industrial Surface Coating. In most cases alternative method one, default per employee factors, were used, except for SCCs where the per employee-based emission factors yielded unrealistically high values of pollutants. The MDEQ believes that the point source employee deductions performed for each affected SCC (based on NAICS information from U.S. Census Bureau's County Business Patterns, and the MDEQ, AQD's point source inventory) do not account for all of the point source employees, resulting in the high values.

For the SCCs 2401050000 (miscellaneous finished metal) and 2401070000 (motor vehicles), per capita based emission estimates were utilized instead of the per employment based methods, which yielded large values of 486 million lbs VOC (935 tons per summer weekday) and 57 million lbs VOC, respectively. The per capita methods yielded more realistic numbers of 4.6 million and 10.9 million lbs VOC.

For the SCC 2401020000 (furniture and fixtures), the employment based method resulted in an estimate of 31 million lbs (60 tons per summer weekday). The per capita method resulted in an estimate of 20 million lbs. As the estimates for 2401020000 appeared unrealistically large with either method, this category was omitted from the inventory.

Total area source VOC emissions for industrial surface coating for 2005 were approximately 50 million lbs.

From the GLC methodology: Source Identification

Table 4.28-1 provides the codes for each of the fifteen industrial surface coating categories that were identified from searches through the SIC Code List, NAICS, EPA FIRE 6.23 database, and Table 8.5-1 of the EPA's Volume III Chapter 8 Industrial Surface Coating September 1997 publication.

Table 4.28-1: Codes for Industrial Surface Coating

CATEGORY	SCC	SIC	NAICS
Factory Finished Wood	A2401015000	2426-2429, 243-245, 2492, 2499	321113, 321912, 32192, 321911, 321918, 33711, 321212, 321214, 321213, 321991, 321992, 33999, 333414, 321999, 321211
Wood Furniture	A2401020000	25	337122, 337121, 337124, 337214, 33791, 337129, 337125, 337211, 33636, 339942, 337127, 337212, 337215, 33792,
Metal Cans	A2401040000	3411	332431
Misc Finished Metals	240105000	34xx(exclude 341 and 3498)	332211, 332212, 332213, 332999, 332722, 332117, 332912, 332611, 332998, 332913, 332439, 33251, 332919, 332312, 322225, 332618, 332321, 332313, 33242, 332612, 332322, 332311, 339911, 333924, 332114, 332721, 332994, 334518, 332111, 332112, 33637, 332115, 332116, 332214, 332813, 339914, 339912, 332812, 332992, 332993, 332995, 332911
Machinery and Equipment	A2401055000	35	333611, 333618, 333111, 332323, 333312, 333112, 33312, 333131, 336311, 333995, 333132, 333921, 333922, 333923, 333924, 333513, 332997, 333514, 333511, 333515, 333516, 333992, 333518, 333292, 33321, 333291, 333293, 333294, 33322, 33241, 333295, 333911, 332991, 333912, 333411, 333993, 333612, 333994, 333613, 314999, 334418, 333996, 333997, 33271, 333999, 334119, 334518, 333512, 333991, 333412, 336391, 333415, 333913
Large Appliances	A240106000	363	335221, 335222, 335224, 335211, 339999, 333414, 335212, 333298, 335228
Electronic and Other Electrical	2401065000	36,123,357	334111, 334112, 334113, 33422, 334418, 334613, 333992, 335129, 333311, 333313, 339942, 51222, 335311, 335313, 335312, 335991, 335314, 335999, 33511, 335931, 335932, 335121, 335122, 334613, 336321, 335129, 33431, 334612, 334419, 335911, 335912, 333319, 334411, 334412, 334414, 336322, 334415, 334416, 334417, 333618, 33429, 33421
Motor Vehicles	240107000	3711	33611, 336112, 33612, 336211
Other Transportation Coatings	2401075000	37(not 3711,373)	336213, 336312, 336322, 33633, 33634, 33635, 336399, 336212, 336415, 336411, 336412, 54171, 332912, 336999, 336413, 333911, 333924, 33651, 336991, 336414, 336419, 336214, 336992
Marine Coatings	240108000	373	48839, 336611, 336612, 81149
Misc. Product Coatings Manufacturing	240109000		339
Industrial High Performance Maintenance Coatings-	2401100000		811
Other Special Purpose Coatings	2401200000		

VOC factors from Table 8.5-1 of the EIIP guidance were applied to employment estimates based on the U.S. Bureau of the Census document, County Business

Patterns: Michigan, 2003, which was the most recent data available at the time the estimates were created.

References:

1. EPA. STAPPA-ALAPCO-EPA Emission Inventory Improvement Program (EIIP). Volume III: Chapter 8 Industrial Surface Coating September 1997.
2. U. S. Census web site http://www.census.gov/

4.29 Open Burning: Municipal Solid Waste, 2005 Criteria Pollutants

For the category of open burning of municipal solid waste, the EPA's methodology from Appendix A of Documentation for the Final 2002 Nonpoint Sector (Feb 06 Version) National Emission Inventory for Criteria and Hazardous Air Pollutants was followed. The ratio of urban to rural population was obtained from 2000 U.S. Census data, per the EPA's method, then multiplied by a 2005 U.S. Census Bureau estimate of the county population in Michigan to obtain an estimate of rural population in 2005. Per capita emission factors were used, after first excluding those counties where the population was greater than 80 percent urban, under the EPA's presumption that open burning of municipal solid waste would not occur there.

4.30 Outdoor Wood Boilers, 2005 Criteria Pollutant Estimates

The Wisconsin methodology distributed by Mr. Bart Sponseller was followed. Accordingly, the Mid-Atlantic Regional Air Management Association emission factor of 13.82 gram/kilogram wood burned was used.

An estimate of 11.68 cords/yr/unit in Michigan was obtained from Mr. Brian Brady, MDEQ, AQD. Mr. Brady serves as the AQD's outdoor wood boiler expert.

Michigan estimated an average weighted density of 1.65 tons/cord of wood, based on information contained within Table 8 of the U.S. Department of Agriculture survey report Residential Fuelwood Consumption and Production in Michigan, 1992.

Per the Wisconsin methodology, it was assumed that 90 percent of outdoor wood boilers are used in rural areas and 10 percent are used in urban areas. To determine which counties were urban and which were rural, the list of counties that are within Consolidated Statistical Areas (metropolitan areas) was reviewed and 22 affected counties are considered urban. Ten percent of the 29,568 Michigan outdoor wood boilers were apportioned to the urban counties by population. The remaining 90 percent of the outdoor wood boilers were apportioned to the 61 rural counties by population.

4.31 Residential Wood Burning, 2005

Michigan utilized the EIIP methodology's alternative method for estimating emissions from residential wood burning, by apportioning data from the U.S. Census Bureau and the EIA. Two options were available to estimate wood burning households per county.

1. Housing Units with Wood Heat by County was determined by using 1990 U.S. Census Data, Database C90STF3C1, Summary Level State, for House Heating Fuel for Occupied Housing Units.[12] Although this data is for the 1990 year, it did provide a value for each county.
2. Housing Units with Wood Heat by County was determined by using the U.S. Census Bureau's DP-4, Profile of Selected Housing Characteristics: 2000, Data Set: Census 2000 Summary File 3 (SF 3) for Michigan. This file provided a *total* value of households using wood heating. However, no breakdown was given by county.

The MDEQ used the 2000 number of total wood burning households in Michigan, and used the 1990 county proportions of the 1990 total to apportion the 2000 value to the county level.

Then, based on county value for number of wood burning households, the value for state wood use in cords was apportioned to each county. The 2003 state wood use in cords data came from the US MAP States Page, Table 8, Residential Energy Consumption Estimates, Selected Years 1960-2003, Michigan, from the DOE, EIA.[13] Data for 2005 was not yet available.

Once county wood use in cords was produced, the next step was to determine the wood weight in tons for each county. Wood weight was determined by estimating a weighted average wood weight of 1.65 tons per cord, from species and consumption data from Table 8 of the USDA report, Residential Fuelwood Consumption and Production in Michigan, 1992.

Michigan did not have data available on the number of catalytic and non-catalytic woodstoves in Michigan, but did utilize 1993 survey data, which showed the proportions of fireplaces to woodstoves by county in Michigan. This was used to apportion wood weight per county between wood stoves and fireplaces. SCCs and emission factors were selected for fireplaces – cordwood (2104008001), and woodstoves – general (2104008010).

No ozone season activity was estimated, as staff felt it was unlikely that residents would utilize their fireplaces or wood stoves between June 1 and August 31 of each year.

The EPA FIRE 6.23 and Source Summary Database (SSD) list the following Area Mobile Source (AMS) Codes:

A2104008000: Total wood stoves and fireplaces
A2104008001: (lb/ton dry wood burned): Fireplaces - general
A2104008010: (mg/Mg dry wood burned): Wood stoves - general
A2104008030: (lb/ton dry wood burned): Catalytic wood stoves - general
A2104008050: (lb/ton dry wood burned): Non-catalytic wood stoves - general
A2104008051: (lb/ton dry wood burned): Non-catalytic wood stoves - conventional

[12] Information is available at http://venus.census.gov/cdrom/lookup.
[13] The 2003 state wood data is at http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_mi.html.

A2104008052: (lb/ton dry wood burned): Non-catalytic wood stoves - low emitting
A2104008053: (lb/ton dry wood burned): Non-catalytic wood stoves - pellet fired

Michigan selected AMS codes A2104008001 and A2104008010. These were the most appropriate codes, as data exists for the proportion of woodstoves to fireplaces per county in Michigan, but data was not available on numbers of catalytic or non-catalytic wood stoves. Emission factors for A2104008010 were converted from mg/Mg to lb/ton by multiplying by the conversion factor of 2.00E-06.

References:

1. EPA, Factor Information Retrieval System Version 6.23. EPA, 2000.
2. EPA, STAPPA, ALAPCO, Emission Inventory Improvement Program (EIIP), Volume III, July 1997, Chapter 2.

4.32 Structure Fires, 2005 Criteria Emissions

The EIIP guidance from EIIP Volume III, Chapter 18: Structure Fires, was followed. The preferred method for estimating emissions was used, due to the availability of county level structure fire data for 2002. More recent data was not available; the fire statistics data, which was originally kept by the Michigan State Police Fire Marshal Division, is now kept by the Michigan Department of Energy, Labor and Economic Growth (DeLEG). DeLEG was unable to locate more recent county level data on structure fires. The 2002 data was re-used from the 2002 area source emissions inventory. However, it did not provide any detail on the extent of each structure fire, or indicate if the structure was residential or commercial.

The default fuel loading factor provided in the EIIP guidance (1.15 tons of fuel per structure fire) was used. Emission factors for VOC, CO, and NOx were obtained from the EIIP Table 18.4-1.

4.33 Year 2009 and 2018 Stationary Area Source Emission Inventory Projections

See **Section 3.2: Growing Stationary Non-EGU Point, Stationary Area, Locomotive, Shipping, and Aircraft Categories for the Years 2009 and 2018** for reference and methodology for projecting the Stationary Area Source inventory.

4.34 Year 2007 and 2020 Stationary Area Source Emission Inventory Interpolation

See **Section 3.3: Interpolating Stationary Non-EGU Point, Stationary Area, Nonroad, Locomotive, Shipping, and Aircraft Categories to 2007 and 2020** for reference and methodology for interpolating the Stationary Area Source inventory.

5. Nonroad Mobile

5.1 Nonroad Emissions Estimation Exclusive of Locomotive, Shipping, and Aircraft Emissions

Nonroad emission estimates for 2005, 2009, and 2018 were obtained from the EPA's National Mobile Inventory Model (NMIM). The model uses a database to store the information about individual counties, referred to as the NMIM County Database (NCD); the current version is NCD20051207. Recent updates to the model were made by EPA.[14] One of the updates included in this modeling was a correction in the NONROAD.EXE file that includes modifications for permeation. Changes were also made in the external files (15 files) to incorporate recommendations of SEMCOG and LADCO consultants regarding fuel data. Program files for emissions and population data were modified. These changes were made to improve the accuracy of the model estimates and to produce emission values that will be consistent with those that will be used for future ozone and fine particulate SIP demonstrations.

The nonroad emissions estimates were prepared by Wisconsin for all LADCO States, including Michigan. Additional details on the procedures used to prepare these inventory products can be found in the Regional Air Quality Analyses for Ozone, $PM_{2.5}$, and Regional Haze: Technical Support Document prepared by LADCO.

5.2 2005 Aircraft Emissions Estimation

In order to estimate aircraft emissions, aircraft activity was obtained for Michigan airports. MDOT was unable to provide updated information for year 2005. In the absence of updated MDOT 2005 aircraft activity data, commercial aircraft and commercial air freight departure information by aircraft model type was obtained from FAA airport records. For determining airport LTO cycles, the Air Traffic Activity Data System (ATADS) air traffic count database of larger towered airports, Terminal Area Forecast (TAF) air traffic operations database of towered and non-towered airports, and G.C.R. & Associates airport activity data were used. Since ATADS provides aircraft operations for a limited number of the States' airports, TAF aircraft operations estimates were considered where ATADS information was unavailable. G.C.R. & Associates, Inc. consultant data was used for the smaller airports, of which FAA aircraft operations information was unavailable. The following information from the respective sources was considered in the development of emission estimates:

1. Commercial scheduled and non-scheduled aircraft air carrier activity and commercial air freight activity by aircraft model types.
2. General aviation and air taxi annual local and itinerant operations for year 2005.
3. Military annual local and itinerant operations for year 2005. Due to need to have aircraft operations information expressed as LTO cycles, the following assumptions were made:

[14] EPA's recent model updates can be found at www.epa.gov/omswww/models/nonrdmdl/nonrdmdl2005/readme.htm, (NONROAD2005 Update Chronology).

a. For commercial aircraft and commercial air freight activity, the number of annual aircraft annual LTO cycles was assumed to be equal to the number of departures. The daily LTO cycle frequency was then obtained by dividing the yearly LTO cycles by 365.
b. For general aircraft annual local and itinerant airport operations, each respective operations total was divided by two to obtain the corresponding year local and itinerant LTO cycles. The expected daily local and itinerant LTO cycles then were obtained by dividing these annual totals by 365.
c. For military annual local and itinerant operations, each respective operations total was divided by two to obtain the corresponding year local and itinerant LTO cycles. The expected military daily local and itinerant LTO cycles then were obtained by dividing these annual totals by 365.

Airport LTO cycles were further categorized into commercial aircraft by plane and engine type, general aviation itinerant aircraft of unknown aircraft type, general aviation local aircraft of unknown aircraft type, and military aircraft. This was necessary in order to utilize the U.S. DOT, Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System 4.5. A description of this model can be found in the FAA publication entitled: Emissions and Dispersion Modeling System (EDMS) User Manual (September 2004). Commercial and air freight aircraft emission factors per LTO cycle were determined using EDMS 4.5 for each commercial aircraft type models where possible were used at each towered airport. Default commercial aircraft engine type, and EPA default time in mode values for takeoff, approach, and landing roll times were used in the EDMS 4.5 model simulations.

For those aircraft types that could not be determined using the EDMS 4.5 emissions model, aircraft emission factors based upon EPA alternative fleet average procedures were then used to estimate their emissions. These included general aviation and air taxi itinerant aircraft of unknown aircraft type, general aviation local aircraft of unknown aircraft type, and military aircraft. Conversion from total hydrocarbons to VOC was performed based upon EPA guidance.

Aircraft emissions were then obtained by adding emissions contributions from commercial, itinerant general, and local general aircraft, and were reported using the following SCC codes in **Table 5.2-1**.

Table 5.2-1: Michigan Aircraft Emission SCC Codes

AIRCRAFT TYPE	SCC
Military	2275001000
Commercial	2275020000
General Aviation	2275050000

5.3 2005 Locomotive and Shipping Emissions Estimation

The 2005 nonroad shipping and locomotive emissions were prepared using the same techniques used for the 2002 emissions. These estimates are based on work completed by Environ, Environ Report for LADCO, April 2004, 2002 Shipping Emissions Sources, to support LADCO efforts to prepare a 2002 Air Emissions Inventory.[15] The report describes Environ work in developing shipping 2002 air emissions estimates to support air quality modeling.

The estimate of 2005 locomotive and shipping emissions was made by LADCO in the same manner as the 2002 inventory described above. The 2005 estimates are part of LADCO's base M inventory.

5.4 Nonroad Mobile Source Emission Inventory Projections to 2009 and 2018

The nonroad source categories exclusive of locomotive, shipping, and aircraft were grown in the EPA Mobile source model NMIM. The locomotive, shipping, and aircraft non-NMIM source categories were grown using growth factors provided in the report, Development of Growth and Control Factors for Lake Michigan Air Directors Consortium, Final Report, December 14, 2004 done by E.H. Pechan & Associates, Inc. for LADCO (available upon request).

Years 2009 and 2018

See **Section 3.2: Growing Stationary Non-EGU Point, Stationary Area, Locomotive, Shipping, and Aircraft Categories** for references and methodology for projecting the Locomotive, Shipping and Aircraft emissions inventory.

Year 2007 and 2020 Nonroad Mobile Source Emission Inventory Interpolation

See **Section 3.3: Interpolating Stationary Non-EGU Point, Stationary Area, Nonroad, Locomotive, Shipping, and Aircraft Categories** for reference and methodology for interpolating the Stationary Area Source inventory.

6. Onroad Mobile

See **Appendix B** for the onroad mobile source emissions inventory for Southeast Michigan's ozone redesignation request, prepared by SEMCOG on September 17, 2008.

[15] The Environ report is available at http://ladco.org/reports/rpo/MWRPOprojects/Emissions/Environ_Final_Report_nonroad.pdf.

Appendix B: Ozone Redesignation Inventory Onroad Mobile Emissions

On-Road Mobile Source Emissions Inventory for Southeast Michigan's Ozone Redesignation Request

September 17, 2008

Prepared by the
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Table of Contents

List of Tables

On-Road Mobile Source Emissions Inventory for Southeast Michigan's Ozone Redesignation Request

I. Emission Inventory Summary

Tables 1 and 2 below show the average summer weekday on-road mobile source VOC and NOx emissions for the Southeast Michigan nonattainment area (NA). The process used to develop these inventories is described in Sections II and III below.

Table 1: VOC Emissions by County
(tons/summer weekday)

County	Year				
	2002	2005	2007	2009	2020
Lenawee	**3.6**	**2.7**	**2.1**	**1.8**	**0.9**
SEMCOG Counties					
Livingston	6.6	5.0	4.4	3.9	2.3
Macomb	21.8	16.5	13.8	12.2	6.5
Monroe	6.9	5.2	4.5	4.0	2.2
Oakland	45.3	34.0	28.5	25.2	13.2
St. Clair	6.2	4.7	3.9	3.5	2.0
Washtenaw	13.6	10.3	8.8	7.9	4.4
Wayne	68.0	50.4	41.8	36.6	18.8
SEMCOG Total	**168.4**	**126.1**	**105.6**	**93.3**	**49.4**
Nonattainment Area Total	**171.9**	**128.6**	**107.7**	**95.1**	**50.3**

Table 2: NOx Emissions by County
(tons/summer weekday)

County	Year				
	2002	2005	2007	2009	2020
Lenawee	**7.2**	**5.3**	**4.4**	**3.6**	**1.3**
SEMCOG Counties					
Livingston	21.1	16.2	13.5	11.1	3.5
Macomb	54.0	40.6	33.1	27.1	8.6
Monroe	21.6	16.4	13.6	11.2	3.5
Oakland	119.1	88.9	72.6	59.1	17.8
St. Clair	15.3	11.6	9.5	7.8	2.6
Washtenaw	40.8	30.9	25.6	21.0	6.6
Wayne	176.9	130.8	105.9	85.5	25.4
SEMCOG Total	**448.8**	**335.4**	**273.7**	**222.8**	**67.9**
Nonattainment Area Total	**455.9**	**340.8**	**278.1**	**226.4**	**69.2**

II. Key Modeling Inputs and Assumptions for SEMCOG Area

A. Mobile6.2 Input Parameters

As required by the U.S. Environmental Protection Agency (EPA), the emissions inventory was developed using EPA's Mobile6.2 emission factor model. This model allows for the input of certain localized data in order to provide better emission estimates for a given region. Five localized data inputs were used for the SEMCOG portion of the inventory:

- **Minimum & Maximum Daily Temperatures:**. The minimum and maximum summer temperatures used in Mobile6.2 were 67^{o}F and 89^{o}F. These temperatures were derived from local temperature data on the 10 days with the highest ozone concentrations between 2001 and 2003. See Appendix A for more information.

- **Reid Vapor Pressure (RVP):** For the 2002 and 2005 emissions inventories, the averaged observed summertime RVP for these years was used. This data was obtained from the Michigan Department of Agriculture. (see Appendix B) In March of 2006, the state of Michigan passed a law requiring the lowering of Southeast Michigan summer RVP to 7.0 psi., beginning in 2007. Thus, an RVP of 7.0 was used in Mobile6 runs for 2007, 2009 and 2020.

- **Gasoline Sulfur Values:** For 2002, a gasoline sulfur value of 439 ppm was used. This value was derived from 2002 Alliance of Automobile Manufacturers North American Fuel Survey data for Wayne County, Michigan. For years 2005, 2007, 2009 and 2020, Mobile6.2 default sulfur values were used (92, 30 & 30 ppm).

- **Oxygenated Fuels Inputs**: In addition to providing the local gasoline sulfur values, the 2002 North American Fuel Survey data showed that approximately 25% of the fuel sold in Southeast Michigan contained an oxygenate. The vast majority of this oxygenate was ethanol. A small fraction was MTBE. The observed values from the fuel survey were used in SEMCOG's 2002 base year modeling. For all other years, SEMCOG assumed that oxygenate would continue to be present in 25% of the region's gasoline. However, as MTBE has been banned in Michigan since 2003, it was assumed that all of the oxygenate would be ethanol. Table 3 shows the specific oxygenate inputs used in Mobile6.

Table 3
Oxygenated Fuel Inputs Used in Mobile6

Year	Oxygenate	% Market Share	% Weight
2002	Ethanol	20.7	3.2
	MTBE	3.5	1.9
2005 - 2020	Ethanol	25.0	3.2
	MTBE	0.0	0.0

- **Distribution of Vehicle Fleet:** The light-duty vehicle age distribution for the SEMCOG area was developed by the Lake Michigan Air Directors Consortium (LADCO), using 2004 vehicle registration data for the seven-county SEMCOG area. The heavy-duty vehicle age distribution was developed from national data, using EPA guidance. The distributions are provided in Table C.1 of Appendix C.

Sample Mobile6.2 input and output files for the SEMCOG area are provided in appendices D and E.

B. Vehicle Miles of Travel (VMT) Estimation & Emissions Calculation

- **Demographic Data:** Travel forecasts used in developing the on-road mobile emissions inventories were based on demographic data from SEMCOG's 2030 Regional Development Forecast (RDF), which was published in 2001. The RDF forecasts demographic data in five-year increments, beginning in 2000 and extending to 2030. Forecasts for 2002, 2009 and 2020, were derived by interpolating from the nearest five-year increments (i.e. 2002 was developed by interpolating between the 2000 and 2005 forecasts).

- **Description of SEMCOG's travel forecasting model**: VMT forecasts used in the emissions inventories were developed using SEMCOG's TransCAD travel forecasting model. A brief description of this complex model is provided in Appendix F.

- **HPMS Normalization Factors:** In accordance with EPA and FHWA guidance that VMT used to construct mobile source emissions inventories be consistent with that reported through the Highway Performance Monitoring System (HPMS), SEMCOG developed factors to normalize the TransCAD travel model VMT to the Michigan Department of Transportation (MDOT) HPMS VMT. The factors were developed in a three-step process:

  1. Average daily HPMS VMT for the year 2002, stratified by county and functional class, were adjusted to average weekday VMT using MDOT's day-of-week adjustment factors.
  2. Year 2002 TransCAD VMT were aggregated to the same county/functional class stratification.
  3. Normalization factors for each county and functional class were computed by dividing the HPMS VMT by the corresponding TransCAD VMT.

  The weekday adjustment factors used in step 1, along with the resulting normalization factors, are shown in Tables G.1 and G.2 in Appendix G. These factors were applied to travel model VMT, in each of the inventory years.

- **VMT Seasonal Adjustment**: Once the travel model VMT had been normalized to HPMS data, they were converted from average annual weekday to average summer weekday to reflect typical weekday VMT during the ozone season. This was done using the inverse of MDOT's seasonal adjustment factors, which were derived from the State's permanent traffic recorder (PTR) data. The seasonal adjustment factors used in this process are provided in Table G.3 of Appendix G.

- **VMT Distribution by Vehicle Class**: SEMCOG's emissions post-processor apportions each roadway link's hourly VMT among the eight different vehicle classes contained in the Mobile6.2 default descriptive emissions rate tables. This is done by multiplying the hourly VMT by the appropriate vehicle mix factor, listed in Table G.4 in Appendix G. These factors were developed using traffic count data for Southeast Michigan. Freeway factors were computed using year 2000 PTR data from MDOT. Arterial factors were developed from 1999 and 2000 screen line traffic counts, taken by SEMCOG. The conversion of the traffic count data from the standard 13 FHWA bins to the eight vehicle classes in Mobile6 was done using vehicle sales and mileage accumulation data from EPA's technical memorandum: *Fleet Characterization Data for Mobile6*[1].

- **Time of Day and Directional Split Apportioning:** SEMCOG's emission post-processor is designed to capture the temporal variation in emissions. This is accomplished through the application of hour-of-day (K) and directional split (D) factors, developed from 1985 traffic survey data[2]. Table G.5 in Appendix G provides both the hourly distribution and directional split factors. Both sets of factors vary by functional class. They are applied at the link level. Thus the daily VMT for each two-way link is divided into 48 separate values (24 hours x 2 directions for each hour). In the case of one-way links/streets, only the hourly factors are applied, creating 24 hourly VMT values per link.

- **Travel Speed Estimation:** Because of recognized limitations with speeds generated from most travel demand models, SEMCOG's emissions post-processor does not use link speeds from TransCAD. Instead a post-processing equation is used, based on research conducted by Richard Dowling and Alexander Skabardonis in the early 1990's[3]. Their findings, along with speed data collected by SEMCOG in 1992[4], were used to develop the following speed equation[5]:

Avg. Link Speed = Avg. Queue Speed * (Avg. Queue Length/Length) +
Uncongested Speed * (1 – (Avg. Queue Length/Length))

where:	Uncongested Speed	=	$1.24 * \text{Survey Speed}_{(fc,h)}/(1 + (V/C_i)^{11})$
	fc	=	functional class
	h	=	hour of day
	Avg. Queue Speed	=	capacity/lane * 25 ft./vehicle
	Avg. Queue Length	=	average queue * 25 ft./vehicle
	Avg. Queue	=	(Q1 + Q2)/2

[1] U.S. Environmental Protection Agency, *Fleet Characterization Data for Mobile6: Development and Use of Age Distributions, Average Annual Mileage Accumulation Rates, and Projected Vehicle Counts for Use in MOBILE6*, September 2001.
[2] SEMCOG, *Survey of Regional Traffic Volume Patterns in Southeast Michigan*, tables 3–7, 1985.
[3] Dowling, Richard and Alexander Skabardonis, *Improving the Average Travel Speeds Estimated by Planning Models*, Transportation Research Board, January, 1992.
[4] SEMCOG, *Survey of Roadway Speeds in Southeast Michigan*, January, 1993.
[5] More complete documentation of the use of SEMCOG speed survey data in the development of this equation can be found in the document *Redesignation of Southeast Michigan to Attainment for Ozone: Technical Support Document*, jointly published by MDNR, MDOT and SEMCOG in November, 1993.

Q1 = queue at start of time slice
Q2 = queue at end of time slice
= Q1 + (1-hour traffic/lane – 1-hour capacity/lane)

Separate link speeds are calculated for each hour of the day and direction of travel (48 speeds for each two-way link, 24 speeds for each one-way link).

- **Local VMT Estimation and Emissions Calculation:** Because SEMCOG's travel model does not include local (residential) streets, the emissions post-processor uses gross level local road VMT data from MDOT's HPMS to calculate base-year local road emissions. These VMT are allocated among the different vehicle classes using the vehicle mix distribution for arterials during the noon hour (see Table G.5 in Appendix G). A single set of local road emission factors, based on the Mobile6.2 default speed of 12.9 mph, is applied to the local VMT (for each vehicle class) to calculate emissions. This process can be expressed as follows:

$$LRE = \sum_{cv} \text{Local } VMT_c * \%VMT_v * EF_v$$

where: LRE = local road emissions
%VMT = % VMT occurring on an urban arterial at noon hour
c = county
v = vehicle class
EF = emission factor for local road at 12.9 mph

- **Emissions from Freeway and Arterial Travel:** As noted above, EMIS_FRCST follows EPA's *Quality Review Guidelines for 1990 Base Year Inventories*. However, the program does not use the approach of assigning one emission factor for each vehicle type and road type, at a single speed. Instead emissions are calculated at the link level, based on the directional speed and VMT for each hour, on each link. the process can be expressed by the following equation:

$$E_{a-b} = \sum_{k,d,v} VMT_{a-b} \textit{ (in hour h, direction d)} * EF_{fc,s,v} * \%VMT_{fc,v}$$

where: E_{a-b} = emissions for link a-b
h = hour of day
d = direction of travel
v = vehicle class
EF = emissions factor
fc = functional class/facility type
s = average link speed in hour h, direction d

- **Emissions Summation:** Once all emissions have been calculated, they are aggregated by pollutant, vehicle class, functional class and county. Summary reports are then generated showing total emissions for each pollutant by county, road type and vehicle type. Information on VMT and average speed is also provided.

III. Key Modeling Inputs and Assumptions for Lenawee County

A. Mobile6.2 Input Parameters

Three localized Mobile6.2 data inputs were used that are unique to Lenawee County:

- **Reid Vapor Pressure (RVP):** For years 2002 and 2005, SEMCOG used the observed 2002 RVP value for Michigan counties outside Southeast Michigan. This value was 8.8 psi and was computed from Michigan Department of Agriculture gasoline sample data. In 2007, Lenawee County became subject to Southeast Michigan's new 7.0 psi vapor pressure requirement. Thus, Lenawee County Mobile6 runs for years 2007, 2009 and 2020 used an RVP of 7.0.

- **Age Distribution of Vehicle Fleet:** Table C.2 in Appendix C shows the vehicle fleet age distribution used in the model for Lenawee County. The distribution for light-duty vehicles was developed by the Lake Michigan Air Directors Consortium (LADCO) from year 2004 vehicle registration data, and reflects the average distribution for the entire state of Michigan. The distribution for heavy-duty vehicles was the same as that used for the SEMCOG region. It was developed from national data, using EPA guidance.

- **Minimum & Maximum Daily Temperatures:** The same minimum and maximum summer temperatures (67^{o}F and 89^{o}F) were used for both the SEMCOG and Lenawee areas (see section II.A for more information).

B. Vehicle Miles of Travel (VMT) Estimation & Emissions Calculation

- **Vehicle Miles of Travel:** For 2002 and 2005, Lenawee County HPMS data, stratified by functional class, were obtained from MDOT's Universe data file. Forecasted VMT for 2009 and 2020 were obtained from MDOT's Statewide Travel Model, which forecasts average daily travel using an all-or-nothing assignment process. 2007 VMT were interpolated for 2005 and 2009 data.

- **HPMS Normalization Factors:** In accordance with EPA and FHWA guidance, VMT used to construct the Lenawee County mobile source emissions inventories was normalized to the Highway Performance Monitoring System (HPMS). Normalization factors were developed in a three-step process:

  1. 2005 Lenawee County HPMS data, stratified by functional class, were obtained from MDOT's Universe data file.
  2. Year 2005 Statewide Travel Model VMT were aggregated to the same functional classes as the HPMS data.
  3. Normalization factors for each functional class were computed by dividing the HPMS VMT by the corresponding model VMT.

  This normalization was performed by the Michigan Department of Transportation and the resulting VMT was provided to SEMCOG for emissions inventory calculation.

- **VMT Daily and Seasonal Adjustments**: Once the travel model VMT had been normalized to HPMS, they were converted from average annual daily travel to average summer weekday. This was done using the inverse of MDOT's daily and seasonal adjustment factors, which were derived from the State's permanent traffic recorder (PTR) data. Both the daily and seasonal adjustment factors used in this process are included in Table G. 3 of Appendix G. The same factors were used for both the SEMCOG and Lenawee areas.

- **Emissions Calculation:** While SEMCOG area emissions were calculated at the link level, Lenawee County emissions were calculated at a more aggregate level. For a given year, VMT were summed by functional class and multiplied by the composite emission factor for each functional class. The emission factors were calculated using average speed data, by functional class, from MDOT's Statewide Travel Model. The resulting emissions were summed by pollutant. Appendices D and E provide sample Mobile6 input and output files for Lenawee County. Appendix H shows the spreadsheet model used to calculate Lenawee County emissions for each inventory year.

Appendix A:
Southeast Michigan Temperature Data

Appendix A
Southeast Michigan Temperature Data

Southeast Michigan Counties
(Livingston, Macomb, Monroe, Oakland, Port Huron, Washtenaw, Wayne)
Total of 8 Ozone Monitors and 1 NWS Weather Observation Station

10 Days with the Highest Ozone Concentrations:
Consecutive Three Year Period (2001-2003)

Date	Monitor Location	AQS Monitor ID	Concentration (ppm)	Max. Temp.	Min. Temp.
06/25/03	Port Huron	26-147-0005-44201-1	0.123	91	66
07/03/03	New Haven	26-099-0009-44201-1	0.115	90	67
06/25/02	Port Huron	26-147-0005-44201-1	0.114	94	71
06/24/03	New Haven	26-099-0009-44201-1	0.110	88	63
07/19/01	Ypsilanti	26-161-0008-44201-1	0.107	88	71
06/27/01	New Haven	26-099-0009-44201-1	0.105	86	67
06/29/01	Port Huron	26-147-0005-44201-1	0.105	89	70
07/02/03	Warren	26-099-1003-44201-1	0.105	88	63
06/28/01	Warren	26-099-1003-44201-1	0.103	87	68
08/11/02	Port Huron	26-147-0005-44201-1	0.103	88	65
Calculated MOBILE6 Input				**89**	**67**

Notes:

- All meteorological data is taken from NOAA, NCDC *Local Climatological Data* reports acquired by the MDEQ. Where appropriate, values from multiple stations have been averaged to attain values more representative of a particular region.
- Temperatures are reported in degrees fahrenheit.

Appendix B:

Historical RVP Data for Southeast Michigan

Appendix B

Historical RVP data
Southeast Michigan

Year	Avg. Summer RVP SE Michigan[1] (psi)	Amount Below Legal Limit
2002	7.49	0.31
2003	7.54	0.26
2004	7.45	0.35
2005	7.66	0.14
Average	**7.54**	**0.27**

Source: Michigan Dept. of Agriculture fuel sample data. Provided by Celeste Bennett on 11/6/06.

[1]Non-ethanol samples

Appendix C:

Age Distributions for Southeast Michigan Vehicle fleet

Appendix C.1
Age Distribution of SEMCOG Area Fleet by Vehicle Class

Vehicle Age (Years)	Vehicle Class							
	Light Duty Vehicle	Light Duty Truck 1	Light Duty Truck 2	Light Duty Truck 3	Light Duty Truck 4	Heavy Duty Truck	Heavy Duty Bus	Motorcycle
1	0.0919	0.1267	0.1563	0.1325	0.1375	0.031	0.029	0.017
2	0.1225	0.1689	0.2084	0.1767	0.1833	0.082	0.078	0.098
3	0.1262	0.1740	0.2147	0.1820	0.1888	0.068	0.065	0.088
4	0.0866	0.0421	0.1114	0.0940	0.1255	0.077	0.074	0.071
5	0.0438	0.0207	0.0500	0.0383	0.0567	0.065	0.062	0.072
6	0.0452	0.0155	0.0455	0.0500	0.0757	0.082	0.097	0.063
7	0.0359	0.0166	0.0370	0.0256	0.0429	0.062	0.069	0.052
8	0.0345	0.0123	0.0278	0.0233	0.0351	0.047	0.059	0.040
9	0.0337	0.0210	0.0225	0.0228	0.0256	0.037	0.044	0.027
10	0.0419	0.0260	0.0217	0.0300	0.0252	0.036	0.046	0.020
11	0.0401	0.0391	0.0213	0.0296	0.0289	0.042	0.051	0.020
12	0.0409	0.0357	0.0204	0.0248	0.0087	0.048	0.053	0.432
13	0.0390	0.0290	0.0160	0.0227	0.0115	0.045	0.048	0.000
14	0.0374	0.0435	0.0112	0.0175	0.0041	0.041	0.046	0.000
15	0.0351	0.0390	0.0080	0.0208	0.0069	0.038	0.042	0.000
16	0.0338	0.0426	0.0075	0.0228	0.0045	0.031	0.034	0.000
17	0.0270	0.0322	0.0084	0.0179	0.0050	0.026	0.028	0.000
18	0.0194	0.0354	0.0022	0.0140	0.0037	0.014	0.013	0.000
19	0.0174	0.0279	0.0026	0.0132	0.0071	0.010	0.011	0.000
20	0.0133	0.0201	0.0019	0.0101	0.0056	0.010	0.010	0.000
21	0.0094	0.0115	0.0018	0.0075	0.0028	0.010	0.007	0.000
22	0.0049	0.0054	0.0011	0.0040	0.0016	0.018	0.008	0.000
23	0.0027	0.0041	0.0005	0.0021	0.0007	0.017	0.007	0.000
24	0.0026	0.0030	0.0004	0.0012	0.0002	0.014	0.005	0.000
25+	0.0148	0.0078	0.0016	0.0168	0.0125	0.049	0.015	0.000

Source:

Light-Duty: 2004 vehicle registration records for the SEMCOG area from the Michigan Department of Motor Vehicles. Compiled by the Lake Michigan Air Directors Consortium (LADCO), June 2004.

Heavy-Duty: National heavy-duty vehicle distribution, based on EPA publication *Fleet Characterization Data for MOBILE6* , September 2001.

Appendix C.2
Age Distribution of Lenawee County Fleet by Vehicle Class

Vehicle Age (Years)	Vehicle Class							
	Light Duty Vehicle	Light Duty Truck 1	Light Duty Truck 2	Light Duty Truck 3	Light Duty Truck 4	Heavy Duty Truck	Heavy Duty Bus	Motorcycle
1	0.0770	0.0908	0.1308	0.1021	0.1261	0.031	0.029	0.017
2	0.1027	0.1211	0.1743	0.1362	0.1681	0.082	0.078	0.098
3	0.0997	0.1176	0.1693	0.1322	0.1633	0.068	0.065	0.088
4	0.0813	0.0410	0.1038	0.0857	0.1196	0.077	0.074	0.071
5	0.0516	0.0262	0.0673	0.0533	0.0612	0.065	0.062	0.072
6	0.0496	0.0186	0.0590	0.0666	0.0811	0.082	0.097	0.063
7	0.0401	0.0229	0.0512	0.0372	0.0456	0.062	0.069	0.052
8	0.0385	0.0156	0.0394	0.0332	0.0403	0.047	0.059	0.040
9	0.0371	0.0262	0.0292	0.0306	0.0311	0.037	0.044	0.027
10	0.0449	0.0305	0.0284	0.0384	0.0294	0.036	0.046	0.020
11	0.0430	0.0422	0.0283	0.0367	0.0300	0.042	0.051	0.020
12	0.0439	0.0378	0.0257	0.0295	0.0103	0.048	0.053	0.432
13	0.0426	0.0337	0.0209	0.0265	0.0126	0.045	0.048	0.000
14	0.0412	0.0521	0.0166	0.0188	0.0063	0.041	0.046	0.000
15	0.0388	0.0468	0.0114	0.0226	0.0099	0.038	0.042	0.000
16	0.0383	0.0553	0.0112	0.0258	0.0057	0.031	0.034	0.000
17	0.0317	0.0445	0.0131	0.0216	0.0062	0.026	0.028	0.000
18	0.0228	0.0501	0.0033	0.0175	0.0047	0.014	0.013	0.000
19	0.0200	0.0417	0.0040	0.0180	0.0084	0.010	0.011	0.000
20	0.0153	0.0313	0.0032	0.0141	0.0066	0.010	0.010	0.000
21	0.0110	0.0193	0.0031	0.0103	0.0036	0.010	0.007	0.000
22	0.0057	0.0090	0.0019	0.0060	0.0020	0.018	0.008	0.000
23	0.0033	0.0066	0.0008	0.0033	0.0010	0.017	0.007	0.000
24	0.0030	0.0054	0.0007	0.0020	0.0004	0.014	0.005	0.000
25+	0.0171	0.0137	0.0032	0.0318	0.0267	0.049	0.015	0.000

Source:

Light-Duty: 2004 vehicle registration records from the Michigan Department of Motor Vehicles . Statewide averages, compiled by Lake Michigan Air Directors Consortium (LADCO).

Heavy-Duty: National heavy-duty vehicle distribution, based on EPA publication *Fleet Characterization Data for MOBILE6* , September 2001.

Appendix D:

Mobile6.2 Input Files

1. 2002 SEMCOG Input File – Summer (ozone)
2. 2005 SEMCOG Input File – Summer (ozone)
3. 2007 SEMCOG Input File – Summer (ozone)
4. 2009 SEMCOG Input File – Summer (ozone)
5. 2020 SEMCOG Input File – Summer (ozone)
6. 2002 Lenawee Input File – Summer (ozone)
7. 2005 Lenawee Input File – Summer (ozone)
8. 2007 Lenawee Input File – Summer (ozone)
9. 2009 Lenawee Input File – Summer (ozone)
10. 2020 Lenawee Input File – Summer (ozone)

Note: Because of the large size of the SEMCOG input files, only the first portion of the file is provided in this appendix.

Appendix D.1: Mobile6.2 Input File – 2002 SEMCOG Region - Summer

```
> Input File Name  : O:\AirQual\ConfAnal\Mobile62\OzRD_02s.in
> Output File Names: O:\AirQual\ConfAnal\Mobile62\OzRD_02s.txt (CO, VOC & NOx)
>                   O:\AirQual\ConfAnal\Mobile62\OzRD_02s.PM  (PM2.5, SO2 & NH3)
* Mobile6.2 Version: September 2003 executable date, released February 2004.
*                    As of 4/6/06, also uses updated PM heavy duty rate table (PMDZML.csv)
> 2002 Mobile6.2 Input File for 8-Hr Ozone Redesignation Emission Inventory - Summer Scenario
> Produces rates for the following pollutants:
>       CO    (Carbon Monoxide)                              PM2.5 (Fine Particulate Matter)
>       VOC   (Volatile Organic Compounds - HC)              SO2   (Sulfur Dioxide)
>       NOx   (Oxides of Nitrogen)                    NH3   (Ammonia)
> Program utilizes data from the following sources:
>    Fuel RVP:      2002 Michigan Department of Agriculture data (sampling at pumps in SE
>                   Mich.)
>    Min/Max Temp:  Average min & max for 10 highest 8-hour ozone days during the
>                   time period used for nonattainment designations (2001-2003) - temperature
>                   readings are from Detroit Metro Airport, provided by MDEQ.
>    Reg Dist:      LD=2004 Veh Reg data processed by LADCO with VIN decoder
>                  HD=2000 vehicle registration data for Southeast Michigan developed by HB
>    Oxy Fuels:     2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>    Diesel Sulfur: 2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>                   (value is annual average, seasonal data not available)
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
> Designed to create rate tables that feed into the following post-processing program:
>    EMS_FC_M6PM.FOR which calculates link-based mobile source emissions (by hour,
>                    direction & vehicle type) by combining Mobile emission rates with
>                    Travel Demand Model VMT.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
PARTICULATES       :
RUN DATA           :
>******************  Run 1 Section  ******************
FUEL RVP           : 7.5
MIN/MAX TEMP       : 67.  89.
NO REFUELING       :
OXYGENATED FUELS   : .035 .207 .019 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LADCOReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
******************  Scenario 1 **********************
SCENARIO RECORD    : Oz Redes summer 02 freeway - 5 mph
CALENDAR YEAR      : 2002
AVERAGE SPEED      : 5.0 non-ramp 100.0 0.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 380.0 DIESEL SULFUR      : 380.0
******************  Scenario 32 **********************
SCENARIO RECORD    : Oz Redes summer arterial - 5 mph
CALENDAR YEAR      : 2002
AVERAGE SPEED      : 5.0 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 380.0 DIESEL SULFUR      : 380.0
******************  Scenario 63 **********************
SCENARIO RECORD    : CNF3 summer -Local Roads - 12.9 mph
CALENDAR YEAR      : 2002
AVERAGE SPEED      : 12.9 local
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 380.0

END OF RUN
```

Appendix D.2: Mobile6.2 Input File – 2005 SEMCOG Region - Summer

```
> Input File Name  : O:\AirQual\ConfAnal\Mobile62\OzRD_05s.in
> Output File Names: O:\AirQual\ConfAnal\Mobile62\OzRD_05s.txt (CO, VOC & NOx)
>
* Mobile6.2 Version: September 2003 executable date, released February 2004.
*                    As of 4/6/06, also uses updated PM heavy duty rate table (PMDZML.csv (3/17/2006))
> 2005 Mobile6.2 Input File for 8-Hr Ozone Redesignation Emission Inventory - Summer Scenario
> Produces rates for the following pollutants:
>       CO    (Carbon Monoxide)                          PM2.5 (Fine Particulate Matter)
>       VOC   (Volatile Organic Compounds - HC)          SO2   (Sulfur Dioxide)
>       NOx   (Oxides of Nitrogen)                 NH3   (Ammonia)
> Program utilizes data from the following sources:
>    Fuel RVP:      2005 Michigan Department of Agriculture data (sampling at pumps in SE
>                   Mich.)
>    Min/Max Temp:  Average min & max for 10 highest 8-hour ozone days during the
>                   time period used for nonattainment designations (2001-2003) - temperature
>                   readings are from Detroit Metro Airport, provided by MDEQ.
>    Reg Dist:      LD=2004 Veh Reg data processed by LADCO contractor using VIN decoder
>                  HD=2000 vehicle registration data for Southeast Michigan developed by HB
>    Oxy Fuels:     Market share derived from 2002 Alliance of Automobile Manufacturers (AAM)
>                   fuel survey, provided through Air Improvement Resources Inc (AIR). In 2005
>                   All oxygenate is ethanol.  MTB now banned in Michigan.
>    Diesel Sulfur: 2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>                   (value is annual average, seasonal data not available)
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
> Designed to create rate tables that feed into the following post-processing program:
>    EMS_FC_M6PM.FOR which calculates link-based mobile source emissions (by hour,
>                    direction & vehicle type) by combining Mobile emission rates with
>                    Travel Demand Model VMT.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
PARTICULATES       :
RUN DATA           :
>******************  Run 1 Section  ******************
FUEL RVP           : 7.7
MIN/MAX TEMP       : 67.  89.
NO REFUELING       :
OXYGENATED FUELS   : .000 .250 .000 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LADCOReg.D
* Use local data on gasoline sulfur content for 2000-2005
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
******************  Scenario 1 **********************
SCENARIO RECORD    : Oz Redes summer 05 freeway - 5 mph
CALENDAR YEAR      : 2005
AVERAGE SPEED      : 5.0 non-ramp 100.0 0.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 106.3
******************  Scenario 32 **********************
SCENARIO RECORD    : Oz Redes summer arterial - 5 mph
CALENDAR YEAR      : 2005
AVERAGE SPEED      : 5.0 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 106.3
******************  Scenario 63 **********************
SCENARIO RECORD    : CNF3 summer -Local Roads - 12.9 mph
CALENDAR YEAR      : 2005
AVERAGE SPEED      : 12.9 local
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 106.3
END OF RUN
```

Appendix D.3: Mobile6.2 Input File –2007 SEMCOG Region - Summer

```
> Input File Name  : O:\AirQual\ConfAnal\Mobile62\OzRD_07s.in
> Output File Names: O:\AirQual\ConfAnal\Mobile62\OzRD_07s.txt (CO, VOC & NOx)
>                   O:\AirQual\ConfAnal\Mobile62\OzRD_07s.PM  (PM2.5, SO2 & NH3)
* Mobile6.2 Version: September 2003 executable date, released February 2004.
*                    As of 4/6/06, also uses updated PM heavy duty rate table (PMDZML.csv (3/17/2006))
> 2007 Mobile6.2 Input File for 8-Hr Ozone Redesdignation Emission Inventory - Summer Scenario
> Produces rates for the following pollutants:
>       CO    (Carbon Monoxide)                              PM2.5 (Fine Particulate Matter)
>       VOC   (Volatile Organic Compounds - HC)              SO2   (Sulfur Dioxide)
>       NOx   (Oxides of Nitrogen)                           NH3   (Ammonia)
> Program utilizes data from the following sources:
>    Fuel RVP:      New legal summertime maximum in SE Michigan, beginning in 2007.
>    Min/Max Temp:  Average min & max for 10 highest 8-hour ozone days during the
>                   time period used for nonattainment designations (2001-2003) - temperature
>                   readings are from Detroit Metro Airport, provided by MDEQ.
>    Reg Dist:      LD=2004 Veh Reg data processed by LADCO with VIN decoder
>                  HD=2000 vehicle registration data for Southeast Michigan developed by HB
>    Oxy Fuels:     Market share derived from 2002 Alliance of Automobile Manufacturers (AAM)
>                   fuel survey, provided through Air Improvement Resources Inc (AIR). In 2005
>                   All oxygenate is ethanol.  MTB now banned in Michigan.
>    Diesel Sulfur: 2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>                   (value is annual average, seasonal data not available)
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
> Designed to create rate tables that feed into the following post-processing program:
>    EMS_FC_M6PM.FOR which calculates link-based mobile source emissions (by hour,
>                    direction & vehicle type) by combining Mobile emission rates with
>                    Travel Demand Model VMT.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
PARTICULATES       :
RUN DATA           :
>******************  Run 1 Section  ******************
FUEL RVP           : 7.0
MIN/MAX TEMP       : 67.  89.
NO REFUELING       :
OXYGENATED FUELS   : .000 .250 .000 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LADCOReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
******************  Scenario 1 **********************
SCENARIO RECORD    : Oz Redes summer 07 freeway - 5 mph
CALENDAR YEAR      : 2007
AVERAGE SPEED      : 5.0 non-ramp 100.0 0.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
******************  Scenario 32 **********************
SCENARIO RECORD    : Oz Redes summer arterial - 5 mph
CALENDAR YEAR      : 2007
AVERAGE SPEED      : 5.0 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
******************  Scenario 63 **********************
SCENARIO RECORD    : Oz Redes summer Local Roads - 12.9 mph
CALENDAR YEAR      : 2007
AVERAGE SPEED      : 12.9 local
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
END OF RUN
```

Appendix D.4: Mobile6.2 Input File –2009 SEMCOG Region - Summer

```
> Input File Name  : O:\AirQual\ConfAnal\Mobile62\OzRD_09s.in
> Output File Names: O:\AirQual\ConfAnal\Mobile62\OzRD_09s.txt (CO, VOC & NOx)
>                   O:\AirQual\ConfAnal\Mobile62\OzRD_09s.PM  (PM2.5, SO2 & NH3)
* Mobile6.2 Version: September 2003 executable date, released February 2004.
*                    As of 4/6/06, also uses updated PM heavy duty rate table (PMDZML.csv (3/17/2006))
> 2009 Mobile6.2 Input File for 8-Hr Ozone Redesignation Emission Inventory - Summer Scenario
> Produces rates for the following pollutants:
>       CO    (Carbon Monoxide)                              PM2.5 (Fine Particulate Matter)
>       VOC   (Volatile Organic Compounds - HC)              SO2   (Sulfur Dioxide)
>       NOx   (Oxides of Nitrogen)                    NH3   (Ammonia)
> Program utilizes data from the following sources:
>    Fuel RVP:      New legal summertime maximum in SE Michigan, beginning in 2007.
>    Min/Max Temp:  Average min & max for 10 highest 8-hour ozone days during the
>                   time period used for nonattainment designations (2001-2003) - temperature
>                   readings are from Detroit Metro Airport, provided by MDEQ.
>    Reg Dist:      LD=2004 Veh Reg data processed by LADCO with VIN decoder
>                  HD=2000 vehicle registration data for Southeast Michigan developed by HB
>    Oxy Fuels:     Market share derived from 2002 Alliance of Automobile Manufacturers (AAM)
>                   fuel survey, provided through Air Improvement Resources Inc (AIR). In 2005
>                   All oxygenate is ethanol.  MTB now banned in Michigan.
>    Diesel Sulfur: 2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>                   (value is annual average, seasonal data not available)
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
> Designed to create rate tables that feed into the following post-processing program:
>    EMS_FC_M6PM.FOR which calculates link-based mobile source emissions (by hour,
>                    direction & vehicle type) by combining Mobile emission rates with
>                    Travel Demand Model VMT.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
PARTICULATES       :
RUN DATA           :
>******************  Run 1 Section  ******************
FUEL RVP           : 7.0
MIN/MAX TEMP       : 67.  89.
NO REFUELING       :
OXYGENATED FUELS   : .000 .250 .000 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LADCOReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
******************  Scenario 1 **********************
SCENARIO RECORD    : Oz Redes summer 09 freeway - 5 mph
CALENDAR YEAR      : 2009
AVERAGE SPEED      : 5.0 non-ramp 100.0 0.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
******************  Scenario 32 **********************
SCENARIO RECORD    : Oz Redes summer arterial - 5 mph
CALENDAR YEAR      : 2009
AVERAGE SPEED      : 5.0 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
******************  Scenario 63 **********************
SCENARIO RECORD    : Oz Redes summer Local Roads - 12.9 mph
CALENDAR YEAR      : 2009
AVERAGE SPEED      : 12.9 local
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
END OF RUN
```

Appendix D.5: Mobile6.2 Input File – 2020 SEMCOG Region - Summer

```
> Input File Name  : O:\AirQual\ConfAnal\Mobile62\OzRD_20s.in
> Output File Names: O:\AirQual\ConfAnal\Mobile62\OzRD_20s.txt (CO, VOC & NOx)
>                   O:\AirQual\ConfAnal\Mobile62\OzRD_20s.PM  (PM2.5, SO2 & NH3)
* Mobile6.2 Version: September 2003 executable date, released February 2004.
*                    As of 4/6/06, also uses updated PM heavy-duty rate table (PMDZML.csv
*                    (3/17/2006))
> 2020 Mobile6.2 Input File for 8-Hr Ozone Redesignation Emission Inventory - Summer Scenario
> Produces rates for the following pollutants:
>       CO    (Carbon Monoxide)                              PM2.5 (Fine Particulate Matter)
>       VOC   (Volatile Organic Compounds - HC)              SO2   (Sulfur Dioxide)
>       NOx   (Oxides of Nitrogen)                    NH3   (Ammonia)
> Program utilizes data from the following sources:
>    Fuel RVP:      New legal summertime maximum in SE Michigan, beginning in 2007.
>    Min/Max Temp:  Average min & max for 10 highest 8-hour ozone days during the
>                   time period used for nonattainment designations (2001-2003) - temperature
>                   readings are from Detroit Metro Airport, provided by MDEQ.
>    Reg Dist:      LD=2004 Veh Reg data processed by LADCO with VIN decoder
>                  HD=2000 vehicle registration data for Southeast Michigan developed by HB
>    Oxy Fuels:     Market share derived from 2002 Alliance of Automobile Manufacturers (AAM)
>                   fuel survey, provided through Air Improvement Resources Inc (AIR). In 2005
>                   All oxygenate is ethanol.  MTB now banned in Michigan.
>    Diesel Sulfur: New national maximum, beginning in 2006.
>    Gas Sulfur:    New national maximum, fully phased-in in 2006.
> Designed to create rate tables that feed into the following post-processing program:
>    EMS_FC_M6PM.FOR which calculates link-based mobile source emissions (by hour,
>                   direction & vehicle type) by combining Mobile emission rates with
>                   Travel Demand Model VMT.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
PARTICULATES       :
RUN DATA           :
>******************  Run 1 Section  *******************
FUEL RVP           : 7.0
MIN/MAX TEMP       : 67.  89.
NO REFUELING       :
OXYGENATED FUELS   : .000 .250 .000 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LADCOReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
******************  Scenario 1 **********************
SCENARIO RECORD    : Oz Redes summer 2020 freeway - 5 mph
CALENDAR YEAR      : 2020
AVERAGE SPEED      : 5.0 non-ramp 100.0 0.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
******************  Scenario 32 **********************
SCENARIO RECORD    : Oz Redes summer arterial - 5 mph
CALENDAR YEAR      : 2020
AVERAGE SPEED      : 5.0 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
******************  Scenario 63 **********************
SCENARIO RECORD    : Oz Redes summer Local Roads - 12.9 mph
CALENDAR YEAR      : 2020
AVERAGE SPEED      : 12.9 local
EVALUATION MONTH   : 7
PARTICLE SIZE      : 2.5
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
DIESEL SULFUR      : 15.0
END OF RUN
```

Appendix D.6: Mobile6.2 Input File – 2002 Lenawee County - Summer

```
> Input File Name  : O:\AirQual\8-HourOz\Redesig\M6Files\Len_02s.in
> Output File Names: O:\AirQual\8-HourOz\Redesig\M6Files\Len_02s.txt

> Mobile6.2 Version: September 2003 executable date, released February 2004.

> 2002 Mobile6.2 Input File for Lenawee Cnty 8-Hr Ozone Redesdignation Emission Inventory - Summer
> Produces rates for the following pollutants:

>       CO    (Carbon Monoxide)
>       VOC   (Volatile Organic Compounds - HC)
>       NOx   (Oxides of Nitrogen)

> Program utilizes data from the following sources:
>    Fuel RVP:      2002 Observed Michigan Summertime RVP outside of Southeast Michigan. Compiled
>                   by MDEQ, using data collected by MDOA.
>    Min/Max Temp:  See 2003 Ozone Maintenance Plan Revision for temperature documentation.
>    Reg Dist:      2002 vehicle registration data for Michigan, developed by LADCO.
>    Oxy Fuels:     2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
>    Avg Speeds:    Provided by MDOT from Statewide model.
> Designed to create rate tables that feed into the following post-processing program
>    EM_Estimate_Model.xls: calculates Lenawee County mobile source emissions, by
>                           functional class, combining Mobile6.2 composite emission rates
>                           with MDOT Statewide Model VMT & speeds.
******************  Header Section  ******************
MOBILE6 INPUT FILE :

RUN DATA           :
>******************  Run 1 Section  *******************
FUEL RVP           : 8.8
MIN/MAX TEMP       : 67. 89.
NO REFUELING       :
* Use local vehicle age distribution data from external file
REG DIST           : LenReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
******************  Scenario 1 **********************
SCENARIO RECORD    : Summer 2002 - 47.6 mph - Rural non-freeway
CALENDAR YEAR      : 2002
AVERAGE SPEED      : 47.6 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
******************  Scenario 2 **********************
SCENARIO RECORD    : Summer 2002 - 37.2 mph - Urban non-freeway
CALENDAR YEAR      : 2002
AVERAGE SPEED      : 37.2 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7

END OF RUN
```

Appendix D.7: Mobile6.2 Input File – 2005 Lenawee County - Summer

```
> Input File Name  : O:\AirQual\8-HourOz\Redesig\M6Files\Len_05s.in
> Output File Names: O:\AirQual\8-HourOz\Redesig\M6Files\Len_05s.txt

> Mobile6.2 Version: September 2003 executable date, released February 2004.

> 2005 Mobile6.2 Input File for Lenawee Cnty 8-Hr Ozone Redesdignation Emission Inventory - Summer
> Produces rates for the following pollutants:

>       CO    (Carbon Monoxide)
>       VOC   (Volatile Organic Compounds - HC)
>       NOx   (Oxides of Nitrogen)
> Program utilizes data from the following sources:
>    Fuel RVP:      2002 Observed Michigan Summertime RVP outside of Southeast Michigan. Compiled
>                   by MDEQ, using data collected by MDOA.
>    Min/Max Temp:  See 2003 Ozone Maintenance Plan Revision for temperature documentation.
>    Reg Dist:      2002 vehicle registration data for Michigan, developed by LADCO.
>    Oxy Fuels:     2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
>    Avg Speeds:    Provided by MDOT from Statewide model.
> Designed to create rate tables that feed into the following post-processing program
>    EM_Estimate_Model.xls: calculates Lenawee County mobile source emissions, by
>                           functional class, combining Mobile6.2 composite emission rates
>                           with MDOT Statewide Model VMT & speeds.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
RUN DATA           :
>******************  Run 1 Section  ******************
FUEL RVP           : 8.8
MIN/MAX TEMP       : 67. 89.
NO REFUELING       :
* Use local vehicle age distribution data from external file
REG DIST           : LenReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
******************  Scenario 1 **********************
SCENARIO RECORD    : Summer 2005 - 45.5 mph - Rural non-freeway
CALENDAR YEAR      : 2005
AVERAGE SPEED      : 45.5 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
******************  Scenario 2 **********************
SCENARIO RECORD    : Summer 2005 - 34.9 mph - Urban non-freeway
CALENDAR YEAR      : 2005
AVERAGE SPEED      : 34.9 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7

END OF RUN
```

Appendix D.8: Mobile6.2 Input File – 2007 Lenawee County - Summer

```
> Input File Name  : O:\AirQual\8-HourOz\Redesig\M6Files\Len_07s.in
> Output File Names: O:\AirQual\8-HourOz\Redesig\M6Files\Len_07s.txt

> Mobile6.2 Version: September 2003 executable date, released February 2004.

> 2007 Mobile6.2 Input File for Lenawee Cnty 8-Hr Ozone Redesdignation Emission Inventory - Summer
> Produces rates for the following pollutants:

>       CO    (Carbon Monoxide)
>       VOC   (Volatile Organic Compounds - HC)
>       NOx   (Oxides of Nitrogen)
> Program utilizes data from the following sources:
>    Fuel RVP:      Maximum allowable summer RVP in in Southeast Michigan.
>    Min/Max Temp:  See 2003 Ozone Maintenance Plan Revision for temperature documentation.
>    Reg Dist:      2002 vehicle registration data for Michigan, developed by LADCO.
>    Oxy Fuels:     2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
>    Avg Speeds:    Interpolated from MDOT 2005 & 2009 Statewide model speeds (New SE Data).
> Designed to create rate tables that feed into the following post-processing program
>    EM_Estimate_Model.xls: calculates Lenawee County mobile source emissions, by
>                           functional class, combining Mobile6.2 composite emission rates
>                           with MDOT Statewide Model VMT & speeds.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
RUN DATA           :
>******************  Run 1 Section  *******************
FUEL RVP           : 7.0
MIN/MAX TEMP       : 67. 89.
NO REFUELING       :
OXYGENATED FUELS   : .000 .250 .000 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LenReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
>*************************************************
>*             Generation of Rate Tables          *
******************  Scenario 1 **********************
SCENARIO RECORD    : Summer 2007 - 45.2 mph - Rural non-freeway
CALENDAR YEAR      : 2007
AVERAGE SPEED      : 45.2 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
******************  Scenario 2 **********************
SCENARIO RECORD    : Summer 2007 - 34.6 mph - Urban non-freeway
CALENDAR YEAR      : 2007
AVERAGE SPEED      : 34.6 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7


END OF RUN
```

Appendix D.9: Mobile6.2 Input File – 2009 Lenawee County - Summer

```
> Input File Name  : O:\AirQual\8-HourOz\Redesig\M6Files\Len_09s.in
> Output File Names: O:\AirQual\8-HourOz\Redesig\M6Files\Len_09s.txt

> Mobile6.2 Version: September 2003 executable date, released February 2004.

> 2009 Mobile6.2 Input File for Lenawee Cnty 8-Hr Ozone Redesdignation Emission Inventory - Summer
> Produces rates for the following pollutants:
>       CO    (Carbon Monoxide)
>       VOC   (Volatile Organic Compounds - HC)
>       NOx   (Oxides of Nitrogen)
> Program utilizes data from the following sources:
>    Fuel RVP:      Maximum allowable summer RVP in Southeast Michigan.
>    Min/Max Temp:  See 2003 Ozone Maintenance Plan Revision for temperature documentation.
>    Reg Dist:      2002 vehicle registration data for Michigan, developed by LADCO.
>    Oxy Fuels:     2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
>    Avg Speeds:    Provided by MDOT from Statewide model.
> Designed to create rate tables that feed into the following post-processing program
>    EM_Estimate_Model.xls: calculates Lenawee County mobile source emissions, by
>                           functional class, combining Mobile6.2 composite emission rates
>                           with MDOT Statewide Model VMT & speeds.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
RUN DATA           :
>*****************  Run 1 Section  ******************
FUEL RVP           : 7.0
MIN/MAX TEMP       : 67. 89.
NO REFUELING       :
OXYGENATED FUELS   : .000 .250 .000 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LenReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
>*************************************************
>*             Generation of Rate Tables              *
******************  Scenario 1 **********************
SCENARIO RECORD    : Summer 2009 – 44.8 mph - Rural non-freeway
CALENDAR YEAR      : 2009
AVERAGE SPEED      : 44.8 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
******************  Scenario 2 **********************
SCENARIO RECORD    : Summer 2009 – 34.3 mph - Urban non-freeway
CALENDAR YEAR      : 2009
AVERAGE SPEED      : 34.3 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7

END OF RUN
```

Appendix D.10: Mobile6.2 Input File – 2020 Lenawee County – Summer

```
> Input File Name  : O:\AirQual\8-HourOz\Redesig\M6Files\Len_18s.in
> Output File Names: O:\AirQual\8-HourOz\Redesig\M6Files\Len_18s.txt

> Mobile6.2 Version: September 2003 executable date, released February 2004.

> 2020 Mobile6.2 Input File for Lenawee Cnty 8-Hr Ozone Redesdignation Emission Inventory - Summer
> Produces rates for the following pollutants:
>       CO    (Carbon Monoxide)
>       VOC   (Volatile Organic Compounds - HC)
>       NOx   (Oxides of Nitrogen)
> Program utilizes data from the following sources:
>    Fuel RVP:      Maximum allowable summer RVP in Southeast Michigan.
>    Min/Max Temp:  See 2003 Ozone Maintenance Plan Revision for temperature documentation.
>    Reg Dist:      2002 vehicle registration data for Michigan, developed by LADCO.
>    Oxy Fuels:     2002 Alliance of Automobile Manufacturers (AAM) fuel survey, provided
>                   through Air Improvement Resources Inc (AIR).
>    Gas Sulfur:    2002 data from both the AAM fuel survey and the Southwest Research
>                   Institute fuel survey. The latter was provided by Bob Leidich of British
>                   Petroleum.
>    Avg Speeds:    Provided by MDOT from Statewide model.
> Designed to create rate tables that feed into the following post-processing program
>    EM_Estimate_Model.xls: calculates Lenawee County mobile source emissions, by
>                           functional class, combining Mobile6.2 composite emission rates
>                           with MDOT Statewide Model VMT & speeds.
******************  Header Section  ******************
MOBILE6 INPUT FILE :
RUN DATA           :
>*****************  Run 1 Section  ******************
FUEL RVP           : 7.0
MIN/MAX TEMP       : 67. 89.
NO REFUELING       :
OXYGENATED FUELS   : .000 .250 .000 .032 2
* Use local vehicle age distribution data from external file
REG DIST           : LenReg.D
* Use local data on gasoline sulfur content for 2000-2002
FUEL PROGRAM       : 4
 310.0  420.0  439.0  259.0  121.0   92.0    33.0    33.0
  30.0   30.0   30.0   30.0   30.0   30.0    30.0    30.0
 600.0  600.0  600.0  600.0  303.0  303.0    87.0    87.0
  80.0   80.0   80.0   80.0   80.0   80.0    80.0    80.0
>*************************************************
>*             Generation of Rate Tables              *
>*************************************************
SCENARIO RECORD    : Summer 2020 – 44.4 mph - Rural non-freeway
CALENDAR YEAR      : 2020
AVERAGE SPEED      : 44.4 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7
*****************  Scenario 2 *********************
SCENARIO RECORD    : Summer 2020 – 33.6 mph - Urban non-freeway
CALENDAR YEAR      : 2020
AVERAGE SPEED      : 33.6 arterial 0.0 100.0 0.0 0.0
EVALUATION MONTH   : 7


END OF RUN
```

Appendix E:

Sample MOBILE6.2 Model Output

1. 2002 SEMCOG Output File – Summer (ozone)
2. 2005 SEMCOG Output File – Summer (ozone)
3. 2007 SEMCOG Output File – Summer (ozone)
4. 2009 SEMCOG Output File – Summer (ozone)
5. 2020 SEMCOG Output File – Summer (ozone)
6. 2002 Lenawee Output File – Summer (ozone)
7. 2005 Lenawee Output File – Summer (ozone)
8. 2007 Lenawee Output File – Summer (ozone)
9. 2009 Lenawee Output File – Summer (ozone)
10. 2020 Lenawee Output File – Summer (ozone)

Note: Because of the large size of the SEMCOG output files, only the first portion of the files is provided in this appendix.

Appendix E.1: Mobile6.2 Output File – SEMCOG 2002 – Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\AIRQUAL\8_HOUROZ\REDESIG\M6FILES\OZRD (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.


* Reading Registration Distributions from the following external
* data file: LADCOREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**         Generation of Freeway Rate Tables          *
*****************************************************

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Oz Redes summer 02 freeway - 5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M581 Warning:
             The user supplied freeway average speed of  5.0
             will be used for all hours of the day. 100% of VMT
             has been assigned to the freeway roadway type for
             all hours of the day and all vehicle types.

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV
```

```
* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

* Reading Ammonia (NH3) Basic Emissiion Rates
* from the external data file PMNH3BER.D

* Reading Ammonia (NH3) Sulfur Deterioration Rates
* from the external data file PMNH3SDR.D

                    Calendar Year:  2002
                            Month:  July
                         Altitude:  Low
               Minimum Temperature:  67.0 (F)
               Maximum Temperature:  89.0 (F)
                 Absolute Humidity:   75. grains/lb
                  Nominal Fuel RVP:   7.5 psi
                     Weathered RVP:   7.5 psi
               Fuel Sulfur Content:  439. ppm

               Exhaust I/M Program:  No
                  Evap I/M Program:  No
                       ATP Program:  No
                  Reformulated Gas:  No

   Ether Blend Market Share: 0.035       Alcohol Blend Market Share: 0.207
   Ether Blend Oxygen Content: 0.019     Alcohol Blend Oxygen Content: 0.032
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                 <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
    VMT Distribution:    0.4223    0.3374    0.1241              0.0314    0.0008    0.0019    0.0781    0.0040    1.0000
  ---------------------------------------------------------------------------------------------------------------------
  Composite Emission Factors (g/mi):
      Composite VOC :      4.020     2.376     3.139     2.581     7.579    1.414     1.196     1.750      7.65     3.297
      Composite CO  :     27.00     19.16     24.21     20.52     81.40     4.021     2.730    12.087     71.81    24.669
      Composite NOX :      2.075     1.776     2.267     1.908     3.962    2.270     1.901    24.204      1.10     3.782
  ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.2: Mobile6.2 Output File – SEMCOG 2005 – Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\AIRQUAL\8_HOUROZ\REDESIG\M6FILES\OZRD (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.


* Reading Registration Distributions from the following external
* data file: LADCOREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**         Generation of Freeway Rate Tables          *
*****************************************************

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Oz Redes summer 05 freeway - 5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M581 Warning:
             The user supplied freeway average speed of  5.0
             will be used for all hours of the day. 100% of VMT
             has been assigned to the freeway roadway type for
             all hours of the day and all vehicle types.

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV
```

```
* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

* Reading Ammonia (NH3) Basic Emissiion Rates
* from the external data file PMNH3BER.D

* Reading Ammonia (NH3) Sulfur Deterioration Rates
* from the external data file PMNH3SDR.D

                    Calendar Year:  2005
                            Month:  July
                         Altitude:  Low
               Minimum Temperature:  67.0 (F)
               Maximum Temperature:  89.0 (F)
                 Absolute Humidity:   75. grains/lb
                  Nominal Fuel RVP:   7.7 psi
                     Weathered RVP:   7.7 psi
               Fuel Sulfur Content:   92. ppm

               Exhaust I/M Program:  No
                  Evap I/M Program:  No
                       ATP Program:  No
                  Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                 <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
    VMT Distribution:    0.3816    0.3670    0.1349              0.0311    0.0005    0.0020    0.0791    0.0038    1.0000
   ---------------------------------------------------------------------------------------------------------------------
  Composite Emission Factors (g/mi):
      Composite VOC :      3.214     1.634     2.172     1.778     5.858     1.132     0.904     1.406      7.71     2.444
      Composite CO  :     17.60     11.85     15.35     12.79     57.14     3.602     1.992    10.020     71.45    15.982
      Composite NOX :      1.441     1.116     1.658     1.262     3.300     1.813     1.345    17.579      1.10     2.684
   ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.3: Mobile6.2 Output File – SEMCOG 2007 – Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\STAFF\WEIDNER\AIRQUAL\SIP_DEV\8_HOURO (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.


* Reading Registration Distributions from the following external
* data file: LADCOREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**         Generation of Freeway Rate Tables          *
*****************************************************

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Oz Redes summer 07 freeway - 5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M581 Warning:
             The user supplied freeway average speed of  5.0
             will be used for all hours of the day. 100% of VMT
             has been assigned to the freeway roadway type for
             all hours of the day and all vehicle types.

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV
```

```
* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

* Reading Ammonia (NH3) Basic Emissiion Rates
* from the external data file PMNH3BER.D

* Reading Ammonia (NH3) Sulfur Deterioration Rates
* from the external data file PMNH3SDR.D

                    Calendar Year:  2007
                            Month:  July
                         Altitude:  Low
               Minimum Temperature:  67.0 (F)
               Maximum Temperature:  89.0 (F)
                 Absolute Humidity:   75. grains/lb
                  Nominal Fuel RVP:   7.0 psi
                     Weathered RVP:   7.1 psi
               Fuel Sulfur Content:   33. ppm

               Exhaust I/M Program:  No
                  Evap I/M Program:  No
                       ATP Program:  No
                  Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                 <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
    VMT Distribution:    0.3535    0.3878    0.1425              0.0309    0.0004    0.0022    0.0791    0.0037    1.0000
   ---------------------------------------------------------------------------------------------------------------------
  Composite Emission Factors (g/mi):
      Composite VOC :      2.488     1.240     1.639     1.347     4.279    0.701     0.654     1.253      7.50     1.855
      Composite CO  :     14.40      9.46     12.16     10.18     45.24     2.719     1.442     9.081     71.45    12.872
      Composite NOX :      1.118     0.783     1.212     0.898     2.660    1.110     0.847    14.565      1.10     2.111
   ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.4: Mobile6.2 Output File – SEMCOG 2009 – Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\AIRQUAL\8_HOUROZ\REDESIG\M6FILES\OZRD (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.


* Reading Registration Distributions from the following external
* data file: LADCOREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**         Generation of Freeway Rate Tables          *
*****************************************************

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Oz Redes summer 09 freeway - 5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M581 Warning:
             The user supplied freeway average speed of  5.0
             will be used for all hours of the day. 100% of VMT
             has been assigned to the freeway roadway type for
             all hours of the day and all vehicle types.

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV
```

```
* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

* Reading Ammonia (NH3) Basic Emissiion Rates
* from the external data file PMNH3BER.D

* Reading Ammonia (NH3) Sulfur Deterioration Rates
* from the external data file PMNH3SDR.D

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
               Minimum Temperature:  67.0 (F)
               Maximum Temperature:  89.0 (F)
                 Absolute Humidity:   75. grains/lb
                  Nominal Fuel RVP:   7.0 psi
                     Weathered RVP:   7.1 psi
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  No
                  Evap I/M Program:  No
                       ATP Program:  No
                  Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                 <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
    VMT Distribution:    0.3268    0.4074    0.1497              0.0309    0.0003    0.0023    0.0791    0.0036    1.0000
  ---------------------------------------------------------------------------------------------------------------------
  Composite Emission Factors (g/mi):
      Composite VOC :      2.134     1.057     1.394     1.148     3.238    0.462     0.506     1.103      7.43     1.552
      Composite CO  :     13.25      8.56     10.61      9.11     33.35     2.288     1.236     7.010     71.45    11.250
      Composite NOX :      0.955     0.612     0.952     0.703     2.113    0.680     0.575    11.518      1.10     1.685
  ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.5: Mobile6.2 Output File – SEMCOG 2020 – Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\STAFF\WEIDNER\AIRQUAL\SIP_DEV\8_HOURO (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.


* Reading Registration Distributions from the following external
* data file: LADCOREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**         Generation of Freeway Rate Tables          *
*****************************************************

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Oz Redes summer 2020 freeway - 5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M581 Warning:
             The user supplied freeway average speed of  5.0
             will be used for all hours of the day. 100% of VMT
             has been assigned to the freeway roadway type for
             all hours of the day and all vehicle types.

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV
```

```
* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

* Reading Ammonia (NH3) Basic Emissiion Rates
* from the external data file PMNH3BER.D

* Reading Ammonia (NH3) Sulfur Deterioration Rates
* from the external data file PMNH3SDR.D

                    Calendar Year:  2020
                            Month:  July
                         Altitude:  Low
               Minimum Temperature:  67.0 (F)
               Maximum Temperature:  89.0 (F)
                 Absolute Humidity:   75. grains/lb
                  Nominal Fuel RVP:   7.0 psi
                     Weathered RVP:   7.1 psi
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  No
                  Evap I/M Program:  No
                       ATP Program:  No
                  Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.2496    0.4636    0.1704              0.0310    0.0002    0.0026    0.0793    0.0033    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.919     0.619     0.797     0.667     1.318     0.134     0.230     0.706      7.41     0.774
     Composite CO  :      9.18      6.68      8.01      7.04     26.69     1.619     0.878     1.488     71.45     7.938
     Composite NOX :      0.449     0.326     0.511     0.375     0.435     0.097     0.210     2.154      1.10     0.538
  ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.6: Mobile6.2 Sample Output File – 2002 Lenawee County – Summer (ozone)

```
*****************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                                *
* Input file: O:\STAFF\WEIDNER\AIRQUAL\SIP_DEV\8_HOURO (file 1, run 1).     *
*****************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.


* Reading Registration Distributions from the following external
* data file: LENREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**             Generation of Rate Tables             *
*****************************************************

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2002 - 47.6 mph - Rural non-freeway
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 47.6
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
                    Calendar Year:  2002
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   8.8 psi
                    Weathered RVP:   8.5 psi
              Fuel Sulfur Content:  439. ppm
              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No
```

```
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.4265    0.3304    0.1217              0.0328    0.0009    0.0019    0.0816    0.0042    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      1.410     0.949     1.252     1.031     1.361    0.625     0.496     0.451      3.05     1.163
    Composite CO  :      18.11     16.53     20.00     17.47     16.03    1.458     0.889     2.199     11.69    16.378
    Composite NOX :      1.218     1.146     1.451     1.228     5.590    1.557     1.309    14.145      1.37     2.422
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2002 - 37.2 mph - Urban non-freeway
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 37.2
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2002
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   8.8 psi
                    Weathered RVP:   8.5 psi
              Fuel Sulfur Content:  439. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.4265    0.3304    0.1217              0.0328    0.0009    0.0019    0.0816    0.0042    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      1.493     0.989     1.299     1.072     1.598    0.686     0.556     0.542      3.18     1.233
    Composite CO  :      16.17     14.69     18.00     15.58     16.79    1.527     0.943     2.456     13.31    14.752
    Composite NOX :      1.188     1.100     1.408     1.182     5.181    1.378     1.155    12.730      1.29     2.259
 ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.7: Mobile6.2 Sample Output File – 2005 Lenawee County– Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\STAFF\WEIDNER\AIRQUAL\SIP_DEV\8_HOURO (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.


* Reading Registration Distributions from the following external
* data file: LENREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**             Generation of Rate Tables             *
*****************************************************

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2005 - 45.5 mph - Rural non-freeway
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
                    Calendar Year:  2005
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   8.8 psi
                    Weathered RVP:   8.5 psi
              Fuel Sulfur Content:   92. ppm
              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No
```

```
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3859    0.3598    0.1325              0.0325    0.0006    0.0020    0.0826    0.0040    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      1.065     0.646     0.846     0.700     1.051    0.538     0.372     0.373      3.06     0.834
    Composite CO  :     11.48      9.64     11.80     10.22     11.21    1.369     0.638     1.829     11.83    10.027
    Composite NOX :      0.867     0.785     1.102     0.871     4.594    1.241     0.917    10.065      1.33     1.752
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2005 - 34.9 mph - Urban non-freeway
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 34.9
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                   Calendar Year:  2005
                           Month:  July
                        Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   8.8 psi
                    Weathered RVP:   8.5 psi
              Fuel Sulfur Content:   92. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3859    0.3598    0.1325              0.0325    0.0006    0.0020    0.0826    0.0040    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      1.151     0.687     0.895     0.743     1.257    0.596     0.427     0.459      3.24     0.903
    Composite CO  :     10.32      8.72     10.71      9.25     12.37    1.459     0.697     2.137     13.93     9.175
    Composite NOX :      0.848     0.754     1.070     0.839     4.243    1.132     0.834     9.190      1.27     1.645
 ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.8: Mobile6.2 Sample Output File – 2007 Lenawee County – Summer (ozone)

```
*****************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                                *
* Input file: O:\STAFF\WEIDNER\AIRQUAL\SIP_DEV\8_HOURO (file 1, run 1).     *
*****************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.
* Reading Registration Distributions from the following external
* data file: LENREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**             Generation of Rate Tables             *
*****************************************************
 * # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2007 - 45.2 mph - Rural non-freeway
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.2
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
                    Calendar Year:  2007
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   7.0 psi
                    Weathered RVP:   7.1 psi
              Fuel Sulfur Content:   33. ppm
              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                Reformulated Gas:  No
   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                         Alcohol Blend RVP Waiver: Yes
```

```
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3579    0.3806    0.1402              0.0323    0.0004    0.0021    0.0827    0.0039    1.0000
 ---------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      0.837     0.499     0.661     0.543     0.760     0.331     0.290     0.334      2.57     0.645
    Composite CO  :      8.82      7.16      8.92      7.63      8.11      0.988     0.492     1.658     11.22     7.571
    Composite NOX :      0.685     0.586     0.863     0.661     3.744     0.782     0.635     8.373      1.33     1.410
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2007 - 34.6 mph - Urban non-freeway
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 34.6
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
                    Calendar Year:  2007
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   7.0 psi
                    Weathered RVP:   7.1 psi
              Fuel Sulfur Content:   33. ppm
              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                Reformulated Gas:  No
   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                         Alcohol Blend RVP Waiver: Yes
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3579    0.3806    0.1402              0.0323    0.0004    0.0021    0.0827    0.0039    1.0000
 ---------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      0.894     0.527     0.697     0.573     0.901     0.370     0.334     0.412      2.76     0.693
    Composite CO  :      7.98      6.52      8.17      6.97      9.04      1.064     0.540     1.952     13.28     6.989
    Composite NOX :      0.674     0.566     0.840     0.640     3.459     0.718     0.581     7.677      1.27     1.328
 ---------------------------------------------------------------------------------------------------------------------
```

Appendix E.9: Mobile6.2 Sample Output File – 2009 Lenawee County – Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\STAFF\WEIDNER\AIRQUAL\SIP_DEV\8_HOURO (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
              User has disabled the calculation of REFUELING emissions.
* Reading Registration Distributions from the following external
* data file: LENREG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
              User has supplied post-1999 sulfur levels.
*****************************************************
**             Generation of Rate Tables             *
*****************************************************
 * # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2009 - 44.8 mph - Rural non-freeway
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 44.8
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   7.0 psi
                    Weathered RVP:   7.1 psi
              Fuel Sulfur Content:   30. ppm
              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                Reformulated Gas:  No
   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                          Alcohol Blend RVP Waiver: Yes
```

```
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3311    0.4001    0.1473              0.0324    0.0003    0.0022    0.0828    0.0038    1.0000
 -------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      0.741     0.433     0.559     0.467     0.633     0.211     0.226     0.296      2.50     0.556
    Composite CO  :      8.00      6.30      7.68      6.67      5.98      0.779     0.405     1.283     11.26     6.641
    Composite NOX :      0.588     0.475     0.696     0.535     2.966     0.478     0.439     6.624      1.33     1.138
 -------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2009 - 34.3 mph - Urban non-freeway
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 34.3
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   7.0 psi
                    Weathered RVP:   7.1 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                Reformulated Gas:  No
   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                          Alcohol Blend RVP Waiver: Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3311    0.4001    0.1473              0.0324    0.0003    0.0022    0.0828    0.0038    1.0000
 -------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      0.791     0.457     0.589     0.493     0.738     0.238     0.260     0.365      2.69     0.596
    Composite CO  :      7.27      5.76      7.04      6.10      6.71      0.848     0.447     1.519     13.37     6.141
    Composite NOX :      0.581     0.462     0.680     0.520     2.742     0.441     0.405     6.108      1.27     1.078
 -------------------------------------------------------------------------------------------------------------------------
```

Appendix E.10: Mobile6.2 Sample Output File – 2020 Lenawee County – Summer (ozone)

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: O:\STAFF\WEIDNER\AIRQUAL\SIP_DEV\8_HOURO (file 1, run 1).   *
************************************************************************
******************  Run 1 Section  ******************
  M603 Comment:
               User has disabled the calculation of REFUELING emissions.
* Reading Registration Distributions from the following external
* data file: LENREG.D
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M616 Comment:
               User has supplied post-1999 sulfur levels.
*****************************************************
**             Generation of Rate Tables             *
*****************************************************
 * # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2020 - 44.4 mph - Rural non-freeway
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 44.4
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12
                    Calendar Year:  2020
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  67.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   7.0 psi
                    Weathered RVP:   7.1 psi
              Fuel Sulfur Content:   30. ppm
              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No
   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
```

```
  Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                        Alcohol Blend RVP Waiver: Yes
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                 <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.2535    0.4564    0.1681              0.0325    0.0002    0.0025    0.0832    0.0035    1.0000
 -------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      0.303     0.224     0.309     0.247     0.260     0.056     0.099     0.190      2.49     0.264
    Composite CO  :      5.27      4.48      5.37      4.72      4.79      0.511     0.260     0.273     11.32     4.504
    Composite NOX :      0.264     0.235     0.360     0.268     0.609     0.067     0.146     1.264      1.32     0.364
 -------------------------------------------------------------------------------------------------------------------------
 * # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 2020 - 33.6 mph - Urban non-freeway
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
           The user supplied arterial average speed of 33.6
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b
  M 48 Warning:
            there are no sales for vehicle class LDDT12
                  Calendar Year:  2020
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  67.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   7.0 psi
                  Weathered RVP:   7.1 psi
            Fuel Sulfur Content:   30. ppm
            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
              Reformulated Gas:  No
  Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.250
  Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.032
                                        Alcohol Blend RVP Waiver: Yes
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:                 <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.2535    0.4564    0.1681              0.0325    0.0002    0.0025    0.0832    0.0035    1.0000
 -------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      0.326     0.236     0.326     0.260     0.307     0.065     0.114     0.238      2.70     0.284
    Composite CO  :      4.83      4.10      4.92      4.32      5.47      0.564     0.291     0.329     13.59     4.177
    Composite NOX :      0.261     0.228     0.352     0.261     0.561     0.062     0.135     1.170      1.26     0.350
 -------------------------------------------------------------------------------------------------------------------------
```

Appendix F

Description of SEMCOG Travel Forecasting Model

TRAVEL DEMAND FORECASTING PROCESS

FOR

THE METROPOLITAN DETROIT REGION

Revised February 2006

Liyang Feng, Ph.D., P.E.
Modeling Coordinator

Southeast Michigan Council of Governments

Travel Demand Forecasting Process For The Metropolitan Detroit Region

February 2003

Introduction

The regional Travel Demand Forecast Model (TDFM) quantifies the amount of travel expected to take place on the transportation system. The results are used to estimate the impacts of constructing new or improved highways, or implementing alternative transportation services or demand management activities. The TDFM is capable of estimating the number of vehicles on regional freeways, the vehicle miles traveled, and highway delays. This information is used in the Metropolitan Planning Organization process to aid decision-makers in selecting transportation plan alternatives, policies, and programs. In addition, the results are used to provide detailed information, such as traffic volumes, to state, regional, and local engineers and planners for use in facility design.

The TDFM is calibrated based on information collected in the *1994 SEMCOG Household-based Person Trip Survey*, *1996 Regional Commercial Vehicle Survey*, *1995 DDOT On-Board Survey,* and *2002 SEMCOG Regional Transit On-Board Survey*. The surveys recorded the number of trips made, trip purpose, origin and destination of the trip, travel mode, how transit was accessed, time of day the trips were made, and other pertinent information concerning both the trips and travelers.

Model Description

The TDFM is run on personal computers using TransCAD, a Window-based urban transportation planning model program. The major elements of the system mirror the hierarchy of decisions faced by travelers: whether to make a trip, where to make a trip, what mode to use, what time of day to travel, and what route to take. The TDFM involves a four-step process of trip generation, trip distribution, mode choice, and highway assignment, and is based upon forecasts of urban activity and a model of the highway and transit networks. An initial version, E1, was completed in October 2002. Subsequent improvements produced version E2 to be used for initial 2030 RTP process. The E3 version was completed in October 2004 and was used to produce final 2030 RTP forecasts.

Urban Activity

Urban activity forecasts provide information on the location and intensity of future activity. In development forecasting, regional control totals are established for population, households, and employment. An econometric model is used to relate the regional economy to national forecasts. Demographic models are used to predict the population needed to support the projected labor force. Reasonableness tests are then conducted. These analyses are based on 248 forecasting districts using such factors as miles of arterial roadway, freeway interchanges, vacant and available land, growth over the last decade, percent of area served by water supplies, as well as the general area type (urban, suburban, and rural). Local land use and zoning plans are used to sub-allocate activity to over 1,400 separate geographic units or traffic analysis zones (TAZ).

Items forecast include a joint distribution of households by auto ownership (zero, one, two, and three or more vehicles) and household size (one, two, three, four, and five or more persons). Households by auto ownership groups have been defined using trip generation characteristics based on 1990 Census data. Employment is estimated by major group (basic, retail-wholesale, and other employment).

Highway Network

Descriptions of the highway network provide information on the "supply" of transportation. This information on infrastructure and services is used in estimating urban activity, as well as determining where people will go and what mode they will use to get there. The TDFM uses detailed estimates of highway infrastructure, including information on over 19,000 roadway segments, such as location, length, number of lanes, functional classification, and area type. For the functional classification, the TDFM uses freeway, principal arterial, minor arterial, collector, local, and seven basic ramp classes. For the area type, the TDFM uses urban, suburban, and rural. Minimum travel paths are calculated using time on the highway system. The SEMCOG travel model network has reconciled to the MGF 2.0. This made the geo-position of the travel model networks very accurate.

Transit Network

Along with the introduction of the TransCAD program, the transit network has been completely re-coded since the introduction of the TransCAD model E1. The services are coded according to year 2000 published schedule provided by regional service provider, DDOT, SMART, AATA, etc. Walk access links, Park and Ride lots are also part of the network configuration.

Trip Generation

The trip generation process forecasts the number of trips that will be made and is conducted for the following nine purposes:

- Home-based work: trips between a worker's home and place of employment;
- Home-based shopping: trips between home and shopping destinations;
- Home-based school: trips between home and school (K-12) destinations;
- Home-based other: trips between home and any other destination for any other purpose;
- Non-home-based work: trips that have one end at work and the other end from locations other than home;
- Non-home-based other: trips include all travel not related to work where both ends are not home;
- Commercial trips: trips are based on three vehicle types: light, medium and heavy vehicles.
- Internal/external trips: trips with one end inside the model area (region) and one outside the model area (region); and
- External/external trips: trips that have neither end in the model area, but pass through the region.

As households have exhibited more stability in trip-making activities over time, and as household characteristics are easier to identify and forecast, the home is used as the basis to predict travel. Cross-classification analysis is used to group households with common socio-

economic characteristics (auto ownership and household size) together to create relatively homogenous groups. Regression analysis is used to predict the trips generated by employment, and households at the destinations

Special generators

Activity within some TAZs is significantly different from regional averages and the differences in predicted trips large enough to change planning decisions on specific roadway or transit facilities. These activities may include airports, recreation and amusement areas, regional shopping centers, military and government complexes, hospitals, and colleges and universities. If the trip generation is large and the differences in trip making from the regional average are significant, trips from these types of land uses may be separately generated based on their specific trip generation characteristics. The Detroit Metropolitan Airport is treated separately from normal trip generation rate, i.e., is a special generator.

Trip distribution

Trip distribution determines the travel volumes between TAZs. This decision must consider both the relative attractiveness and accessibility of all possible destinations in the model area. A gravity model is used to represent this choice for all trip purposes, except external/external trips where a growth factor model is used. The gravity model is designed based on the observation that traffic flow decreases as a function of the distance between TAZs. Separate gravity models are developed for each trip purpose, as different trip purposes exhibit different distribution characteristics. For example, people will travel much further to work than to go shopping. Some special socio-economic adjustment factors are also needed. For example, special factors (called K-factors) are studied to account for the fact that trip making there tends to be more self-contained than the gravity model would initially estimate. The trips by purpose are analyzed using network travel time weighted by period.

Time-of-Day Stratifications

The new improved SEMCOG travel model has four periods, am, mid-day, pm and off peak. The trip tables, mode choice model, the highway and transit assignment are stratified accordingly. The stratification are based on 1994 HH survey and then calibrated using aggregated year 2000 traffic hourly counts.

Mode Choice

Mode choice determines which motorized mode — vehicle or transit — travelers will use. The mode choice component of the TDFM uses a multi-nominal logit model. The model is developed based on 1994 household survey and 1995 DDOT on-board survey. The HOV trip purposes use a simple factoring process to convert person trips into vehicle trips. The model provides auto, walk-to-transit, and drive-to-transit three modes. The mode choice model was revised in 2004 to improve SMART area ridership estimates.

Highway Assignment

The highway assignment model uses a multi-user simultaneous equilibrium assignment algorithm. In equilibrium, all travelers are assigned to their optimal path; no traveler can have a shorter path available. Trips from all TAZs are considered as one assignment iteration. Typically, multiple iterations are required before networks can reach full equilibrium. After each

assignment iteration, link travel times are readjusted and the next assignment performed. The model has four assignments according to time-of-day stratification. All assignments use modified Bureau of Public Roads (BPR) formulas as their volume-delay functions by function class to obtain more realistic speed output. The outputs from the assignments include volume to capacity ratio, link volume, and speed.

Because trips are distributed between TAZs and mode shares calculated based on highway speeds, it is necessary to ensure speeds input to the trip distribution process match the speeds of the resultant highway assignments. A speed balance procedure is introduced to accomplish the task. This may require five to ten full model runs depending on closure criteria.

Future Enhancements

After recent improvement, the SEMCOG travel is now a full four-steps UTPS model with time-of-day and speed balance features. The model is capable to estimate passengers on a new bus service, riders on a new rapid transit line, or the response to certain travel demand management policies, such as imposing higher parking fees. The short-term improvement includes highway volume re-calibration, impedance based assignment, transit speed function development, and mode choice model enhancement. A new version of the travel model, E4, will be in operation in spring 2005 along with the TransCAD version 4.8 upgrade. A new household survey, highway calibration file development, TAZ revision, trip generation and distribution model estimation, and functional class redefinition are among the long-term improvement projects.

Appendix G:

VMT Adjustment Factors

1. Day of Week Adjustment Factors
2. SEMCOG HPMS Normalization Factors
3. Seasonal Adjustment Factors
4. SEMCOG VMT Vehicle Type Mix
5. SEMCOG VMT Time of Day and Directional Split Factors

G.1: Day of Week Adjustment Factors

Area Type	Urban	Urban Area Limit	Rural
Functional Classes Affected	All FC in Detroit	Non-Detroit FCs 11,12,14,16 & 17	Non-Detroit FCs 1,2,6,7 & 20
Weekday Adj. Factor	1.1631	1.0853	0.9795

Source: SEMCOG, developed using *Seasonal Analysis of Michigan's Permanent Traffic Recorder (PTR) Data for 2001, 2002, 2003 (* June 30, 2004) and *Procedures for Emission Inventory Preparation, Volume IV* , p.68, USEPA, 1991.

G.2: SEMCOG HPMS Normalization Factors

County	Freeway	Principal Arterial	Minor Arterial	Collector
Livingston	0.71729	1.43095	0.99751	0.48507
Macomb	0.94553	1.15716	1.07594	0.72317
Monroe	0.88036	1.01051	1.21679	0.56326
Oakland	1.01247	1.01111	0.93977	0.58730
St. Clair	0.93610	1.13184	1.49806	0.88520
Washtenaw	0.89010	0.98385	0.95585	0.65702
Wayne				
Detroit	1.07239	1.33760	1.30060	1.65738
Outer-Wayne	0.99878	1.24813	1.21355	1.51076

G.3: Seasonal Adjustment Factors

Area Type	Urban	Urban Area Limit	Rural
Area Affected	Detroit	Outer Wayne, Oakland & Macomb Counties	Liv., Mon., St. Clair, Wash. & Lenawee
Summer Adjustment Factor	1.0370	1.0210	1.1505
Winter Adjustment Factor	0.9423	0.9450	0.8814

Source: SEMCOG, developed using *Seasonal Analysis of Michigan's Permanent Traffic Recorder (PTR) Data for 2001, 2002, 2003 (* June 30, 2004) and *Procedures for Emission Inventory Preparation, Volume IV* , p.68, USEPA, 1991.

G.4: Southeast Michigan VMT Vehicle Mix Factors for Typical Weekday

Road Type	Hour	Vehicle Type								
		LDGV	LDDV	LDGT 1&2	LDGT 3&4	LDDT	HDGV	HDDV	MC	Total
Freeway[1]	1	46.05	0.34	26.37	9.36	0.25	5.38	12.25	0.00	100.00
	2	43.18	0.32	24.47	8.68	0.23	7.05	16.07	0.00	100.00
	3	39.97	0.30	24.63	8.74	0.23	7.66	17.46	0.00	98.99
	4	37.94	0.28	24.76	8.79	0.23	8.54	19.46	0.00	100.00
	5	40.14	0.30	26.98	9.58	0.26	7.17	16.33	0.00	100.76
	6	44.87	0.33	30.45	10.82	0.29	4.04	9.21	0.00	100.00
	7	45.71	0.34	30.83	10.95	0.29	3.36	7.65	0.87	100.00
	8	49.01	0.36	28.31	10.05	0.26	3.39	7.73	0.87	99.99
	9	46.39	0.34	26.67	9.47	0.25	4.88	11.12	0.87	100.00
	10	41.91	0.31	26.50	9.40	0.25	6.37	14.51	0.87	100.13
	11	40.56	0.30	25.94	9.21	0.24	6.98	15.90	0.87	100.00
	12	40.56	0.30	25.94	9.21	0.24	7.02	15.99	0.87	100.13
	13	41.15	0.30	26.06	9.25	0.24	6.75	15.38	0.87	100.00
	14	41.83	0.31	26.93	9.56	0.25	6.44	14.68	0.87	100.87
	15	42.50	0.31	27.89	9.91	0.27	5.57	12.68	0.87	100.01
	16	43.85	0.32	29.18	10.37	0.27	4.65	10.60	0.87	100.13
	17	46.39	0.34	28.69	10.18	0.27	3.74	8.51	0.87	99.00
	18	48.42	0.36	28.11	9.98	0.26	3.39	7.73	0.87	99.12
	19	48.42	0.36	28.11	9.98	0.26	3.39	7.73	0.87	99.12
	20	47.74	0.35	27.87	9.89	0.26	3.97	9.04	0.87	99.99
	21	48.33	0.36	28.08	9.97	0.26	3.70	8.43	0.87	99.99
	22	48.33	0.36	27.99	9.93	0.26	3.70	8.43	0.00	98.99
	23	48.25	0.36	27.87	9.89	0.26	4.08	9.30	0.00	99.99
	24	47.40	0.35	27.39	9.72	0.25	4.77	10.86	0.00	100.74
Arterial[2]	1	53.71	0.40	29.24	10.38	0.27	1.53	3.48	1.00	100.00
	2	53.04	0.39	29.51	10.47	0.28	1.57	3.58	1.15	100.00
	3	51.58	0.38	29.97	10.64	0.27	1.88	4.28	1.15	100.15
	4	50.23	0.37	30.97	10.99	0.29	1.88	4.28	1.00	100.00
	5	49.08	0.36	31.08	11.04	0.29	2.18	4.97	1.00	100.01
	6	47.42	0.35	31.45	11.17	0.29	2.53	5.77	1.00	100.00
	7	47.63	0.35	30.57	10.86	0.29	3.05	6.95	1.00	100.70
	8	47.94	0.35	28.59	10.15	0.26	3.61	8.23	1.00	100.15
	9	46.59	0.34	28.12	9.98	0.26	3.97	9.04	1.00	99.30
	10	45.70	0.34	29.29	10.39	0.28	4.01	9.14	1.00	100.16
	11	45.70	0.34	29.79	10.58	0.28	3.75	8.55	1.00	100.01
	12	46.28	0.34	29.49	10.46	0.28	3.71	8.45	1.00	100.00
	13	46.95	0.35	28.99	10.29	0.27	3.71	8.45	1.00	100.00
	14	46.95	0.35	28.99	10.29	0.27	3.66	8.34	1.00	99.85
	15	47.16	0.35	28.95	10.27	0.27	3.61	8.23	1.00	99.85
	16	47.16	0.35	29.06	10.31	0.27	3.87	8.82	1.00	100.85
	17	47.84	0.35	28.67	10.18	0.26	3.82	8.71	1.00	100.84
	18	48.72	0.36	28.13	9.98	0.26	3.52	8.02	1.00	100.00
	19	49.87	0.37	28.64	10.17	0.27	2.91	6.63	1.00	99.85
	20	51.11	0.38	29.07	10.32	0.27	2.39	5.45	1.15	100.15
	21	52.26	0.39	29.47	10.46	0.28	2.09	4.76	1.00	100.69
	22	53.14	0.39	28.93	10.27	0.27	1.83	4.17	1.00	100.00
	23	53.82	0.40	29.17	10.35	0.27	1.53	3.48	1.00	100.00
	24	54.60	0.40	29.44	10.45	0.27	1.22	2.78	0.85	100.00

[1]MDOT, Permanent Traffic Recorder (PTR) counts, 2000.

[2]SEMCOG, Screenline traffic count data, 1999 & 2000.

G.5: Hourly Traffic Volume & Directional Split Factors for Typical Weekday

Hour Ending	Time of Day Volume Factors		Directional Split Factors	
	Freeways	Arterials	Freeways	Arterials
1:00 a.m.	0.015	0.014	0.59	0.60
2:00	0.009	0.007	0.58	0.59
3:00	0.007	0.005	0.58	0.60
4:00	0.006	0.003	0.56	0.58
5:00	0.009	0.004	0.59	0.61
6:00	0.022	0.012	0.62	0.67
7:00	0.051	0.031	0.64	0.67
8:00	0.075	0.056	0.61	0.65
9:00	0.064	0.058	0.58	0.60
10:00	0.052	0.048	0.56	0.57
11:00	0.049	0.050	0.54	0.55
12:00	0.051	0.057	0.53	0.54
1:00 p.m.	0.051	0.062	0.53	0.54
2:00	0.052	0.060	0.53	0.54
3:00	0.060	0.065	0.53	0.54
4:00	0.073	0.076	0.55	0.56
5:00	0.079	0.081	0.58	0.58
6:00	0.077	0.079	0.57	0.58
7:00	0.054	0.061	0.56	0.56
8:00	0.038	0.048	0.54	0.55
9:00	0.031	0.040	0.55	0.56
10:00	0.030	0.035	0.55	0.57
11:00	0.026	0.026	0.55	0.61
12:00	0.021	0.021	0.55	0.57

Source: *Survey of Regional Traffic Volume Patterns in Southeast Michigan,* SEMCOG, September 1985.
Note: Based on traffic counts conducted during 1983 and 1984.

Appendix H:

Lenawee Count Emissions Calculation Model

Appendix H

Lenawee County Emissions Model

9/17/08

Forecasts VOC & NOx emissions for 2002, 2007, 2005, 2009, 2020

Ozone 2008 Redesignation Request

2002 - Summer Weekday

Functional Class*	HPMS Avg Daily VMT[1]	Daily Adj Factor[4]	Summer Adj Factor[4]	Summer WD VMT	Avg. Speed[5]	Mobile6 VOC EM Rate (g/mile)[6]	Mobile6 NOx EM Rate (g/mile)[6]	VOC Emissions (VMT*EM Rate) Kg	NOx Emissions (VMT*EM Rate) Kg	VOC Emissions Tons	NOx Emissions Tons
Rural Non-freeway	1,663,357	0.9795	1.1505	1,874,462	47.6	1.163	2.422	2,180.0	4,539.9	2.4	5.0
Urban Non-freeway	721,898	1.1631	1.0370	870,707	37.2	1.233	2.259	1,073.6	1,966.9	1.2	2.2
Total	2,385,256			2,745,169				3,254	6,507	3.6	7.2

2005 - Summer Weekday Using HPMS VMT

Functional Class*	HPMS Avg Daily VMT[1]	Daily Adj Factor[4]	Summer Adj Factor[4]	Summer WD VMT	Avg. Speed[5]	Mobile6 VOC EM Rate (g/mile)[6]	Mobile6 NOx EM Rate (g/mile)[6]	VOC Emissions (VMT*EM Rate) Kg	NOx Emissions (VMT*EM Rate) Kg	VOC Emissions Tons	NOx Emissions Tons
Rural Non-freeway	1,646,685	0.9795	1.1505	1,855,674	45.5	0.834	1.752	1,547.6	3,251.1	1.7	3.6
Urban Non-freeway	796,052	1.1631	1.0370	960,146	34.9	0.903	1.645	867.0	1,579.4	1.0	1.7
Total	2,442,737			2,815,820				2,415	4,831	2.7	5.3

2007 (Interpolated - Summer Weekday Using HPMS VMT

Functional Class*	HPMS Normalized VMT[2]	Daily Adj Factor[4]	Summer Adj Factor[4]	Summer WD VMT	Avg. Speed[2]	Mobile6 VOC EM Rate (g/mile)[6]	Mobile6 NOx EM Rate (g/mile)[6]	VOC Emissions (VMT*EM Rate) Kg	NOx Emissions (VMT*EM Rate) Kg	VOC Emissions Tons	NOx Emissions Tons
Rural Non-freeway	1,684,280	0.9795	1.1505	1,898,040	45.2	0.645	1.410	1,224.2	2,676.2	1.3	2.9
Urban Non-freeway	810,473	1.1631	1.0370	977,539	34.6	0.693	1.328	677.4	1,298.2	0.7	1.4
Total	2,494,753			2,875,579				1,902	3,974	2.1	4.4

2009 - Summer Weekday Growing HPMS VMT

Functional Class*	HPMS Normalized VMT[3]	Daily Adj Factor[4]	Summer Adj Factor[4]	Summer WD VMT	Avg. Speed[5]	Mobile6 VOC EM Rate (g/mile)[6]	Mobile6 NOx EM Rate (g/mile)[6]	VOC Emissions (VMT*EM Rate) Kg	NOx Emissions (VMT*EM Rate) Kg	VOC Emissions Tons	NOx Emissions Tons
Rural Non-freeway	1,721,875	0.9795	1.1505	1,940,406	44.8	0.556	1.138	1,078.9	2,208.2	1.2	2.4
Urban Non-freeway	824,893	1.1631	1.0370	994,932	34.3	0.596	1.078	593.0	1,072.5	0.7	1.2
Total	2,546,768			2,935,338				1,672	3,281	1.8	3.6

2020 - Summer Weekday Growing HPMS VMT

Functional Class*	HPMS Normalized VMT[3]	Daily Adj Factor[4]	Summer Adj Factor[4]	Summer WD VMT	Avg. Speed[5]	Mobile6 VOC EM Rate (g/mile)[6]	Mobile6 NOx EM Rate (g/mile)[6]	VOC Emissions (VMT*EM Rate) Kg	NOx Emissions (VMT*EM Rate) Kg	VOC Emissions Tons	NOx Emissions Tons
Rural Non-freeway	1,872,230	0.9795	1.1505	2,109,844	44.4	0.264	0.364	557.0	768.0	0.6	0.8
Urban Non-freeway	882,366	1.1631	1.0370	1,064,252	33.6	0.284	0.350	302.2	372.5	0.3	0.4
Total	2,754,596			3,174,096				859	1,140	0.9	1.3

*There are no freeways in Lenawee County.

[2]Source: HPMS Universal Data for Lenawee COunty

[2]Source: Interpolated from MDOT 2005 and 2009 VMT.

[2]Source: MDOT Statewide model, normalized to HPMS (factors based on 2005). 2009 and later data are based on new SE data from State Remi model.

[4]Inverse of MDOT daily and seasonal adjustment factors from *Seasonal Analysis of Michigan's Permanent Traffic Recorder (PTR) Data for 2001, 2002, 2003*, June 30, 2004. See O:\AirQual\HPMSAnalysis\MDOT Daily-Seasonal 2002 New Adj Factors.xls for calculations.

[5]Source: MDOT Statewide model.

[6]Mobile 6.2 : O:\Staff\weidner\AirQual\SIP_Dev\8_HourOz\Redesig\M6Files\Len_yrs.dat

Appendix C: Public Hearing Documentation

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PO BOX 30473
LANSING MI 48909-7973

CALENDAR

December 22, 2008

ENVIRONMENTAL ASSISTANCE CENTER 800-662-9278 E-mail: deq-ead-env-assist@michigan.gov	The DEQ Environmental Assistance Center (EAC) is available to provide direct access to DEQ environmental programs, answers to environmental questions, referrals to DEQ technical staff, and quick response. Questions on any items listed in the DEQ Calendar can be referred to the EAC.
PUBLICATION SCHEDULE	The DEQ Calendar is published every two weeks, on alternate Mondays, by the Michigan Department of Environmental Quality. We welcome your comments.
CALENDAR LISTSERV	You may subscribe to receive the DEQ Calendar electronically by sending an Email to the listserv at **LISTSERV@LISTSERV.MICHIGAN.GOV** and in the body of the message type Subscribe, DEQ-CALENDAR, and your name.
INTERNET ACCESS www.michigan.gov/deqcalendar	The DEQ Calendar is available on the DEQ World Wide Web site in pdf and html format. Access the calendar at **www.michigan.gov/deqcalendar**.
TIMETABLE FOR DECISIONS	No decision listed in the DEQ Calendar will be made prior to seven days after the initial Calendar publication date.
TIPS FOR CITIZEN INPUT	Refer to the “Public Involvement Handbook, A Citizens Guide” to increase the effectiveness of your input into DEQ programs. Access the handbook at **www.michigan.gov/deq** and click on "Get Involved, Programs for Citizens."

CONTENTS

Recycled Paper

CALENDAR December 22, 2008

Map of DEQ Permit and Other Decisions Before the Office of the Director

Information relating to these decisions is available on the following pages.

CALENDAR December 22, 2008

PART I:
ENVIRONMENTAL ISSUES, PERMITTING AND RELATED REGULATIONS

Permit Decisions Before the Office of the Director

AIR QUALITY DIVISION
See Map - ❶

HOLLAND BOARD OF PUBLIC WORKS – JAMES DEYOUNG PLANT, HOLLAND, OTTAWA COUNTY: Written comments are being accepted until January 30, 2009, on a draft permit for the proposed installation and operation of a 78-megawatt (gross) circulating fluidized bed solid fuel-fired boiler; its associated cooling tower and materials handling operations; and to cease operation/remove an 11.5 megawatt pulverized coal-fired boiler from the existing James DeYoung Plant. The facility is located at 64 Pine Avenue, Holland, Michigan. New Source Review public notice documents can be viewed at www.michigan.gov/deqair. Informational sessions and public hearings will be held on January 12, 2009 and January 13, 2009 (see January 12 and January 13 listings in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by January 30, 2009, will be considered by the decision-maker prior to final action. Information Contact: ***Vrajesh Patel***, Air Quality Division, 517-373-7053. Decision-maker: ***G. Vinson Hellwig***, Air Quality Division Chief.

AIR QUALITY DIVISION
See Map - ❷

HOLLAND BOARD OF PUBLIC WORKS – JAMES DEYOUNG PLANT, HOLLAND, OTTAWA COUNTY: To provide for a future administrative amendment to the Renewable Operating Permit (ROP) No. MI-ROP-B2357-2006a to incorporate proposed Permit to Install (PTI) No. 25-07. Further information on the proposed permit and the public notice documents can be viewed on the Web at www.michigan.gov/deqair. The responsible official of the stationary source is David G. Koster, Power Resources Director, 64 Pine Avenue, Holland, Michigan. Comments on the draft permit are to be submitted by January 30, 2009, to Mary Ann Dolehanty, Acting Permit Section Supervisor, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Information Contact: ***Vrajesh Patel***, Air Quality Division, 517-373-7053. Decision-maker: ***G. Vinson Hellwig***, Air Quality Division Chief.

AIR QUALITY DIVISION
See Map - ❸

WOLVERINE POWER SUPPLY COOPERATIVE, INC., ROGERS CITY, PRESQUE ISLE COUNTY: The public comment period has been extended until January 6, 2009, on a draft permit for the proposed installation and operation of a 600-megawatt coal-fired steam electric power plant. The facility would be located within the Oglebay-Norton Quarry property, Rogers Township, Michigan. New Source Review public notice documents can be viewed at www.michigan.gov/deqair. A public hearing has been scheduled for January 6, 2009 (see January 6, 2009 listing in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by January 6, 2009, will be considered by the decision-maker prior to final action. Information Contact: ***Melissa Byrnes***, Air Quality Division, 517-373-7065. Decision-maker: ***G. Vinson Hellwig***, Air Quality Division Chief.

Other Decisions Before the Office of the Director

AIR QUALITY DIVISION
See Map - ❹

NATIONAL STANDARD COMPANY, NILES, BERRIEN COUNTY. Written comments are being accepted on a proposed Consent Order to administratively resolve alleged air pollution violations. You may obtain copies of the proposed Consent Order and Staff Activity Report on the Web at www.michigan.gov/deqair/proposedconsentorders. Submit written comments to Thomas Andrzejewski, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by December 26, 2008. If a request is received in writing by December 26, 2008, a public hearing will be scheduled. Information Contact: ***Thomas Andrzejewski***, Air Quality Division, 517-373-0134. Decision-maker: ***G. Vinson Hellwig***, Air Quality Division Chief.

AIR QUALITY DIVISION
See Map - ❺

BLUE DIAMOND STEEL CASTING LLC, PIGEON, HURON COUNTY. Written comments are being accepted on a proposed Consent Order to administratively resolve alleged air pollution violations. You may obtain copies of the proposed Consent Order and Staff Activity Report on the

	Web at www.michigan.gov/deqair/proposedconsentorders. Submit written comments to Autumn Lawson, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by January 21, 2009. If a request is received in writing by January 21, 2009, a public hearing will be scheduled. Information Contact: ***Autumn Lawson***, Air Quality Division, 517-241-2120. Decision-maker: ***G. Vinson Hellwig***, Air Quality Division Chief.
AIR QUALITY DIVISION **See Map - ❻**	**OZONE ATTAINMENT REDESIGNATION REQUEST FOR SOUTHEAST MICHIGAN, INCLUDING BASELINE EMISSIONS INVENTORY, AND MAINTENANCE PLAN STATE IMPLEMENTATION PLAN (SIP) REVISION.** The DEQ has prepared a proposal for a redesignation petition and maintenance plan for the eight counties of Southeast Michigan in association with the .08 parts per million National Ambient Air Quality Standards (NAAQS) for ozone. At the conclusion of the 2008 ozone season, all monitors in Southeast Michigan measured air quality that meets the NAAQS for ozone. The DEQ plans to submit the redesignation petition and maintenance plan for Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties to the U.S. Environmental Protection Agency to formally request that Southeast Michigan be redesignated to attainment and classified as "maintenance" under the .08 parts per million NAAQS for ozone. This public comment period will meet the public participation requirements for a SIP submittal. The proposed redesignation SIP revision documents can be viewed on the Web at www.michigan.gov/deqair. Written comments will be taken through January 21, 2009. If a public hearing is requested in writing by January 21, 2009, a public hearing will be held January 27, 2009 (see January 27, 2009 listing in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Sheila Blais. Information Contact: ***Mary Maupin***, Air Quality Division, 517-373-7039. Decision-maker: ***G. Vinson Hellwig***, Air Quality Division Chief.
ENVIRONMENTAL SCIENCE AND SERVICES DIVISION **See Map - ❼**	**CLEAN CORPORATE CITIZEN DESIGNATION, MAGNESIUM PRODUCTS OF AMERICA, 2001 INDUSTRIAL DRIVE, EATON RAPIDS, EATON COUNTY.** The Michigan Department of Environmental Quality has received an application for Clean Corporate Citizen (C3) designation from Magnesium Products of America, 2001 Industrial Drive, Eaton Rapids, Michigan as provided for under Administrative Rules R324.1508: Clean Corporate Citizen Program. The C3 program provides incentives for improved environmental protection. Regulated establishments that have demonstrated environmental stewardship can receive C3 designation and public recognition for their efforts and are entitled to certain regulatory benefits. Information Contact: ***Donna Davis,*** Environmental Science and Services Division, 517-335-2784. Decision-maker: ***DEQ Director***.
OFFICE OF GEOLOGICAL SURVEY **See Map - ❽**	**KOCOT, TONY 1 WELL (PN11382), SECTION 16, DEEP RIVER TOWNSHIP, ARENAC COUNTY, MICHIGAN.** Notice of intent to determine ownership of abandoned oil and gas well and notice of intent to plug and abandon well or transfer permit by the supervisor of pursuant to Part 615, Supervisor of Wells, and Part 616, Orphan Well Fund, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Any person having information to show they have an ownership interest in this well is encouraged to contact the Supervisor of Wells by Monday, January 12, 2009, at the Office of Geological Survey, P.O. Box 30256, Lansing, Michigan 48909. Information Contact: ***Susan Maul,*** Office of Geological Survey, 517-241-1552. Decision-maker: ***Harold R. Fitch,*** Office of Geological Survey Chief.

Proposed Settlements of Contested Cases

NONE

Administrative Rules Promulgation

NONE

Announcements

LAND AND WATER MANAGEMENT DIVISION	**MINIMUM FLOW RELEASE FROM THE GREENWOOD RESERVOIR TO THE MIDDLE BRANCH ESCANABA RIVER REDUCED BECAUSE OF DROUGHT CONDITIONS.** On December 11, 2008, the MDEQ's Land and Water Management Division authorized the temporary reduction of the

minimum flow release to the Middle Branch Escanaba River. This action is in response to a petition from the Tilden Mining Company. The LWMD concurs that the watershed is experiencing a severe drought, and if weather conditions do not improve, there is a risk that the Greenwood Reservoir will reach conservation pool elevations during the critical winter months in 2008. The required minimum flow release from December 12, 2008, until March 31, 2009, will be based on the following methodology. The release rate will be adjusted once per week. The minimum flow release shall at least equal the average of the previous seven days flow, as measured at the U.S. Geological Survey stream gage #04057800, Middle Branch Escanaba River near Humboldt. In no case shall the flow release be less than 12 cfs. The maximum required flow release is 24 cfs. This authorization is pursuant to the Tilden Mining Company's Amended Order and Permit dated November 2, 1998, issued under the authority of Part 35, Use of Water in Mining Low-Grade Ore, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Information Contact: ***David A. Hamilton***, P.E., Chief, Water Management Section, 517-335-3174.

LAND AND WATER MANAGEMENT DIVISION

CERTIFIED FLOODPLAIN MANAGER (CFM®) EXAM, JANUARY 6, 2009, BAY CITY, MICHIGAN. The Michigan Department of Environmental Quality (DEQ) is pleased to offer the CFM® Examination. The CFM® Program is administered by the Association of State Floodplain Managers, Inc. (ASFPM). The application form and information about the exam can be found at www.floods.org. The application and fee must be received by ASFPM by December 23, 2008. The DEQ will proctor this event at the Saginaw Bay District Office. For additional information, please contact ***Ms. Joy Brooks***, P.E., CFM, Land and Water Management Division, 989-686-8025, extension 8364.

OFFICE OF THE GREAT LAKES

DEADLINE FOR ALL OCEANGOING AND NON-OCEANGOING VESSELS OPERATING ON THE GREAT LAKES, TO SUBMIT BALLAST WATER REPORTING FORMS. The Michigan Department of Environmental Quality (MDEQ) requires all oceangoing and non-oceangoing vessels operating on the Great Lakes to report whether ballast water management practices are being implemented in accordance with Section 3103a of the Michigan Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The Ballast Water Reporting form can be found on the Ballast Water Reporting Web site: www.michigan.gov/deqballastwaterprogram. Completed forms can be submitted online via the Ballast Water Reporting Web site above, by mailed at: Ballast Water Reporting Program, Office of the Great Lakes, Michigan Department of Environmental Quality, P.O. Box 30473, Lansing, MI 48909-7973 or fax at 517-335-4053. Forms should be completed and returned to the MDEQ by February 20, 2009. A list of complying vessels is required by the statute to be available by March 1, 2009. Any owner or operator not identified on the MDEQ Ballast Water Reporting list of complying vessels, or any person in the state having contacts for the transportation of cargo with a vessel operator that is not on the list, will not be eligible for new grants, loans or awards administered by the MDEQ after March 1, 2009. Information contact: ***Jim Bredin***, Office of the Great Lakes, 517-335-4232.

Public Hearings and Meetings

Note: Persons with disabilities needing accommodations for effective participation in any of the meetings noted in this Calendar should call or write the appropriate meeting information contact listed below at least a week in advance to request mobility, visual, hearing, or other assistance.

DECEMBER 26, 2008

DEADLINE FOR PUBLIC COMMENT REGARDING NATIONAL STANDARD COMPANY, NILES, BERRIEN COUNTY. Written comments are being accepted on a proposed Consent Order to administratively resolve alleged air pollution violations. You may obtain copies of the proposed Consent Order and Staff Activity Report on the Web at www.michigan.gov/deqair/proposedconsentorders. Submit written comments to Thomas Andrzejewski, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by December 26, 2008. If a request is received in writing by December 26, 2008, a public hearing will be scheduled. Information Contact: ***Thomas Andrzejewski***, Air Quality Division, 517-373-0134.

DECEMBER 29, 2008

DEADLINE FOR PUBLIC COMMENT REGARDING MANISTIQUE PAPERS INC. (SRN: A6475), MANISTIQUE, SCHOOLCRAFT COUNTY, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of Manistique Papers Inc. (application #200800013). The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP

public notice documents can be viewed on the Web at www.michigan.gov/deqair. The responsible official of the stationary source is John Johnson, General Manager, 453 South Mackinac Avenue, Manistique, Michigan 49854. Comments on the draft permit are to be submitted to Ronald Raisanen, Michigan Department of Environmental Quality, Air Quality Division, Upper Peninsula District Office, 420 Fifth Street, Gwinn, Michigan 49841. The decision-maker for the permit is Brian Brady, District Supervisor. If requested in writing by December 29, 2008, a public hearing will be held on January 15, 2009 (see January 15, 2009 listing in this calendar). Information Contact: ***Ronald Raisanen***, Air Quality Division, 906-346-8504.

JANUARY 5, 2009

DEADLINE FOR PUBLIC COMMENT REGARDING FORD MOTOR COMPANY – MICHIGAN ASSEMBLY PLANT, WAYNE, WAYNE COUNTY, proposed Permit to Install application requesting a flexible permit format. The facility is located at 38303 Michigan Avenue, Wayne, Michigan. Additionally, the request for a flexible permit format will require revisions to Renewable Operating Permit (ROP) No. 199700040a. This public comment period meets the public participation requirements for a future administrative amendment to the ROP. The responsible official for the source is David Drinan, 38303 Michigan Avenue, Wayne, Michigan. New Source Review and ROP public notice documents can be viewed at www.michigan.gov/deqair. If a public hearing is requested in writing by January 5, 2009, a public hearing will be held January 7, 2009 (see January 7, 2009 listing in this calendar). Written comments and/or a request for a hearing should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan, 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. Information Contact: ***Mark Mitchell***, Air Quality Division, 517-373-7077.

JANUARY 6, 2009
1:00 p.m.

PUBLIC HEARING AND DEADLINE FOR PUBLIC COMMENT REGARDING WOLVERINE POWER SUPPLY COOPERATIVE, INC., ROGERS CITY, PRESQUE ISLE COUNTY, on a draft permit for the proposed installation and operation of a 600-megawatt coal-fired steam electric power plant. The facility would be located within the Oglebay-Norton Quarry property, Rogers Township, Michigan. New Source Review public notice documents can be viewed at www.michigan.gov/deqair. A public hearing will be held in the ConCon Conference Rooms, Atrium Level, Constitution Hall, 525 West Allegan Street, Lansing, Michigan. Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by January 6, 2009, will be considered by the decision-maker prior to final action. Information Contact: ***Melissa Byrnes***, Air Quality Division, 517-373-7065.

JANUARY 7, 2009

DEADLINE FOR PUBLIC COMMENT REGARDING DELPHI AUTOMOTIVE SYSTEMS, LLC, SAGINAW STEERING SYSTEMS (SRN: A6175), SAGINAW, SAGINAW COUNTY, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the design and manufacture of steering columns, shafts, integral steering gears, rack and pinion steering gears, power steering pumps, advanced steering systems and complete steering modules with anti-theft features for various vehicle manufacturers. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the Web at www.michigan.gov/deqair. The responsible official of the stationary source is Vincent DeZorzi, General Director, Manufacturing Operations, 3900 Holland Road, Saginaw, Michigan 48601. Comments on the draft permit are to be submitted to Jenny Lang, Michigan Department of Environmental Quality, Air Quality Division, Saginaw Bay District Office, 503 North Euclid Avenue, Bay City, Michigan 48706. The decision-maker for the permit is Chris Hare, District Supervisor. If requested in writing by January 7, 2009, a public hearing may be scheduled. Information Contact: ***Jenny Lang***, Air Quality Division, 989-686-8025, Extension 8254.

JANUARY 7, 2009
1:30 p.m.

TENTATIVELY SCHEDULED PUBLIC HEARING REGARDING FORD MOTOR COMPANY – MICHIGAN ASSEMBLY PLANT, WAYNE, WAYNE COUNTY, proposed Permit to Install application requesting a flexible permit format. The facility is located at 38303 Michigan Avenue, Wayne, Michigan. Additionally, the request for a flexible permit format will require revisions to Renewable Operating Permit (ROP) No. 199700040a. This public comment period meets the public participation requirements for a future administrative amendment to the ROP. The responsible official for the source is David Drinan, 38303 Michigan Avenue, Wayne, Michigan. New Source Review and ROP public notice documents can be viewed at www.michigan.gov/deqair. If a public hearing is requested in writing by January 5, 2009, the public hearing will be held in the Lillian Hatcher Conference Room, Constitution Hall, 3rd Floor, North Tower, 525 West Allegan, Lansing, Michigan.

Those interested may contact the Air Quality Division at 517-373-7077 on January 6, 2009, to determine if a hearing was requested and will be held. Information Contact: ***Mark Mitchell***, Air Quality Division, 517-373-7077.

JANUARY 12, 2009
5:00 p.m. - 6:30 p.m.
Informational Session
7:00 p.m.
Public Hearing

and

JANUARY 13, 2009
12:00 p.m.- 2:00 p.m.
Public Hearing
4:30 p.m. - 5:30 p.m.
Informational Session
5:30 p.m.
Public Hearing

INFORMATIONAL SESSIONS AND PUBLIC HEARINGS REGARDING HOLLAND BOARD OF PUBLIC WORKS – JAMES DEYOUNG PLANT, HOLLAND, OTTAWA COUNTY: Written comments are being accepted on a draft permit for the proposed installation and operation of a 78-megawatt (gross) circulating fluidized bed solid fuel-fired boiler; its associated cooling tower and materials handling operations; and to cease operation/remove an 11.5 megawatt pulverized coal-fired boiler from the existing James DeYoung Plant. The facility is located at 64 Pine Avenue, Holland, Michigan. New Source Review public notice documents can be viewed at www.michigan.gov/deqair. The informational sessions and public hearings will be held at the Doubletree Hotel and Conference Center, Grand Ball Room, 650 East 24th Street, Holland, Michigan. On January 12, 2009, a public hearing will be held at 7:00 p.m. Prior to the hearing, an informational session will be held in an open-house format from 5:00p.m. until 6:30 p.m. Staff will be available to answer questions. Additional public hearings will be held on January 13, 2009, from 12:00 p.m. until 2:00 p.m., and again at 5:30 p.m. Prior to the 5:30 p.m. hearing, an informational session will be held in an open-house format from 4:30 p.m. until 5:30 p.m. Staff will be available to answer questions. Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by January 30, 2009, will be considered by the decision-maker prior to final action. Information Contact: ***Vrajesh Patel***, Air Quality Division, 517-373-7053.

JANUARY 14, 2009
9:30 p.m.

PUBLIC MEETING OF BOARD OF CERTIFICATION FOR MUNICIPAL WASTEWATER TREATMENT PLANT OPERATORS. The Michigan Department of Environmental Quality, Environmental Science and Services Division, will hold a meeting of the Board of Certification for Municipal Wastewater Treatment Plant Operators in the Art Iverson Conference Room, Constitution Hall, 525 W. Allegan, Lansing, Michigan. Proposed minutes of this meeting will be available 30 days after the meeting from the Michigan Department of Environmental Quality, Environmental Science and Services Division, Operator Training and Certification Unit, 3rd Floor South, Constitution Hall, 525 West Allegan, Lansing, Michigan 48913. Information Contact: ***Dan Holmquist***, Environmental Science and Services Division, 517-373-4753, or Email at holmquistd@michigan.gov.

JANUARY 15, 2009
10:00 a.m.

TENTATIVELY SCHEDULED PUBLIC HEARING REGARDING MANISTIQUE PAPERS INC. (SRN: A6475), MANISTIQUE, SCHOOLCRAFT COUNTY, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operations of Manistique Papers Inc. (application #200800013). The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the Web at www.michigan.gov/deqair. The responsible official of the stationary source is John Johnson, General Manager, 453 South Mackinac Avenue, Manistique, Michigan 49854. Comments on the draft permit are to be submitted by December 29, 2008, to Ronald Raisanen, Michigan Department of Environmental Quality, Air Quality Division, Upper Peninsula District Office, 420 Fifth Street, Gwinn, Michigan 49841. The decision-maker for the permit is Brian Brady, District Supervisor. If requested in writing by December 29, 2008, a public hearing will be held at the Michigan Department of Environmental Quality, Upper Peninsula District Office, 420 Fifth Street, Gwinn, Michigan. Those interested may contact the Air Quality Division at 906-346-8504 after December 29, 2008, to determine if a hearing was requested and will be held. Information Contact: ***Ronald Raisanen***, Air Quality Division, 906-346-8504.

JANUARY 15, 2009
6:30 p.m.

PUBLIC HEARING ON PERMIT APPLICATION SUBMITTED BY SIGNATURE DEVELOPMENT, UNION MICHIGAN. The Land and Water Management Division will hold a public informational meeting between 6:30 p.m. and 7:00 p.m. and a public hearing at 7:00 p.m. at the Mason Township Hall, 17049 US Highway 12, Edwardsburg, Michigan 49112. The hearing will be for Permit Application Number 08-14-0061-P, submitted by Signature Development, Attn: Paul Delano, 70861 Baldwin Landing Drive, Union, Michigan 49130. The applicant proposes to construct a residential development and marina at the south end of Juno Lake near Christiana Lake Road and Channel Parkway. Information Contact: ***Larry Poynter,*** Land and Water Management Division, 269-567-3566.

CALENDAR December 22, 2008

JANUARY 21, 2009	**DEADLINE FOR PUBLIC COMMENT REGARDING BLUE DIAMOND STEEL CASTING LLC, PIGEON, HURON COUNTY.** Written comments are being accepted on a proposed Consent Order to administratively resolve alleged air pollution violations. You may obtain copies of the proposed Consent Order and Staff Activity Report on the Web at www.michigan.gov/deqair/proposedconsentorders . Submit written comments to Autumn Lawson, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by January 21, 2009. If a request is received in writing by January 21, 2009, a public hearing will be scheduled. Information Contact: ***Autumn Lawson***, Air Quality Division, 517-241-2120.
JANUARY 21, 2009	**DEADLINE FOR PUBLIC COMMENT REGARDING GENERAL MOTORS CORPORATION (SRN: N6950), LANSING, EATON COUNTY,** for the proposed approval of a draft initial Renewable Operating Permit (ROP) for the operation of a stamping plant, automobile assembling operations, and utilities plant with hot water boiler operations. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the Web at www.michigan.gov/deqair. The responsible officials of the stationary source are Randy Thayer, Plant Manager and Don Morgan, Plant Manager, 8175 Millett Highway, Lansing, Michigan 48917. Comments on the draft permit are to be submitted to Robert Byrnes, Michigan Department of Environmental Quality, Air Quality Division, Lansing District Office, P.O. Box 30242, 4N, Lansing, Michigan 48909. The decision-maker for the permit is Michael F. Masterson, District Supervisor. If requested in writing by January 21, 2009, a public hearing may be scheduled. Information Contact: ***Robert Byrnes***, Air Quality Division, 517-241-2182.
JANUARY 21, 2009	**DEADLINE FOR PUBLIC COMMENT REGARDING GENERAL MOTORS CORPORATION, PONTIAC METAL FABRICATION AND PONTIAC POWERTRAIN (SRN: B4032), PONTIAC, OAKLAND COUNTY,** for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of the Pontiac metal fabrication and Pontiac powertrain facilities. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the Web at www.michigan.gov/deqair. The responsible officials for the stationary source are: Jeri Ojeda, Director Powertrain Laboratories, 895 Joslyn Road, M/C 483-710-106, Pontiac, Michigan 48340; David Prange, Plant Manager, 220 East Columbia Avenue, M/C 483-014-101, Pontiac, Michigan 48340; and William J. McFarland, Director, Work Station s3-375, Engineering Center, 30200 Mound Road, Warren, Michigan 48090. Comments on the draft permit are to be submitted to Robert Byrnes, Michigan Department of Environmental Quality, Air Quality Division, Southeast Michigan District Office, 27700 Donald Court, Warren, Michigan 48092-2793. The decision-maker for the permit is Teresa Seidel, Southeast Michigan District Supervisor. If requested in writing by January 21, 2009, a public hearing may be scheduled. Information Contact: ***Robert Byrnes***, Air Quality Division, 517-241-2182.
JANUARY 21, 2009	**DEADLINE FOR PUBLIC COMMENT REGARDING HERMAN MILLER, INCORPORATED (SRN: B6001), ZEELAND, OTTAWA COUNTY,** for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of an office furniture manufacturing facility. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the Web at www.michigan.gov/deqair. The responsible official of the stationary source is Greg Wrona, General Manager, 855 East Main, P.O. Box 302, Zeeland, Michigan 49464. Comments on the draft permit are to be submitted to Denise Plafcan, Michigan Department of Environmental Quality, Air Quality Division, Grand Rapids District Office, 350 Ottawa Avenue NW, Unit 10, Grand Rapids, Michigan, 49503. The decision-maker for the permit is Heidi Hollenbach, Grand Rapids District Supervisor. If requested in writing by January 21, 2009, a public hearing may be scheduled. Information Contact: ***Denise Plafcan***, Air Quality Division, 616-356-0259.
JANUARY 21, 2009	**DEADLINE FOR PUBLIC COMMENT REGARDING OZONE ATTAINMENT REDESIGNATION REQUEST FOR SOUTHEAST MICHIGAN, INCLUDING BASELINE EMISSIONS INVENTORY, AND MAINTENANCE PLAN STATE IMPLEMENTATION PLAN (SIP) REVISION.** The DEQ has prepared a proposal for a redesignation petition and maintenance plan for the eight counties of Southeast Michigan in association with the .08 parts per million National Ambient Air Quality Standards (NAAQS) for ozone. At the conclusion of the 2008 ozone season, all monitors in Southeast Michigan measured air quality that meets the NAAQS for ozone. The DEQ plans to

submit the redesignation petition and maintenance plan for Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties to the U.S. Environmental Protection Agency to formally request that Southeast Michigan be redesignated to attainment and classified as "maintenance" under the .08 parts per million NAAQS for ozone. This public comment period will meet the public participation requirements for a SIP submittal. The proposed redesignation SIP revision documents can be viewed on the Web at www.michigan.gov/deqair. If a public hearing is requested in writing by January 21, 2009, a hearing will be held January 27, 2009 (see January 27, 2009 listing in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Sheila Blais. Information Contact: ***Mary Maupin***, Air Quality Division, 517-373-7039.

JANUARY 27, 2009 1:30 p.m.

TENTATIVELY SCHEDULED PUBLIC HEARING REGARDING OZONE ATTAINMENT REDESIGNATION REQUEST FOR SOUTHEAST MICHIGAN, INCLUDING BASELINE EMISSIONS INVENTORY, AND MAINTENANCE PLAN STATE IMPLEMENTATION PLAN (SIP) REVISION. The DEQ has prepared a proposal for a redesignation petition and maintenance plan for the eight counties of Southeast Michigan in association with the .08 parts per million National Ambient Air Quality Standards (NAAQS) for ozone. At the conclusion of the 2008 ozone season, all monitors in Southeast Michigan measured air quality that meets the NAAQS for ozone. The DEQ plans to submit the redesignation petition and maintenance plan for Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties to the U.S. Environmental Protection Agency to formally request that Southeast Michigan be redesignated to attainment and classified as "maintenance" under the .08 parts per million NAAQS for ozone. This public comment period will meet the public participation requirements for a SIP submittal. The proposed redesignation SIP revision documents can be viewed on the Web at www.michigan.gov/deqair. If a public hearing is requested in writing by January 21, 2009, a public hearing will be held at the Constitution Hall, Lillian Hatcher Conference Room, 3rd Floor North, 525 West Allegan Street, Lansing, Michigan. Those interested may contact the Air Quality Division at 517-373-7039 after January 21, 2009, to determine if a hearing will be held. Information Contact: ***Mary Maupin***, Air Quality Division, at 517-373-7039.

JANUARY 30, 2009

DEADLINE FOR PUBLIC COMMENT REGARDING HOLLAND BOARD OF PUBLIC WORKS – JAMES DEYOUNG PLANT, HOLLAND, OTTAWA COUNTY, on a draft permit for the proposed installation and operation of a 78-megawatt (gross) circulating fluidized bed solid fuel-fired boiler; its associated cooling tower and materials handling operations; and to cease operation/remove an 11.5 megawatt pulverized coal-fired boiler from the existing James DeYoung Plant. The facility is located at 64 Pine Avenue, Holland, Michigan. New Source Review public notice documents can be viewed at www.michigan.gov/deqair. Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by January 30, 2009, will be considered by the decision-maker prior to final action. Information Contact: ***Vrajesh Patel***, Air Quality Division, 517-373-7053.

Division Permit Contacts

For additional information on permits, contact:

Air Quality Division	517-373-7074 517-335-4607	**Pam Blue** **Cari DeBruler**
Land and Water Management Division (land/water interface permits)	517-373-8798	**Wendy Fitzner**
Office of Geological Survey (oil, gas, mineral well, and sand dune mining permits)	517-241-1545	**Thomas Godbold**
Waste & Hazardous Materials Division	517-335-4034	**Wanda Williams**
Water Bureau Groundwater Permits on Public Notice NPDES Permits on Public Notice Certificates of Coverage on Public Notice	517-241-1346	**Susan Ashcraft**